CANADA

ST. LAWRENCE RIVER PILOT

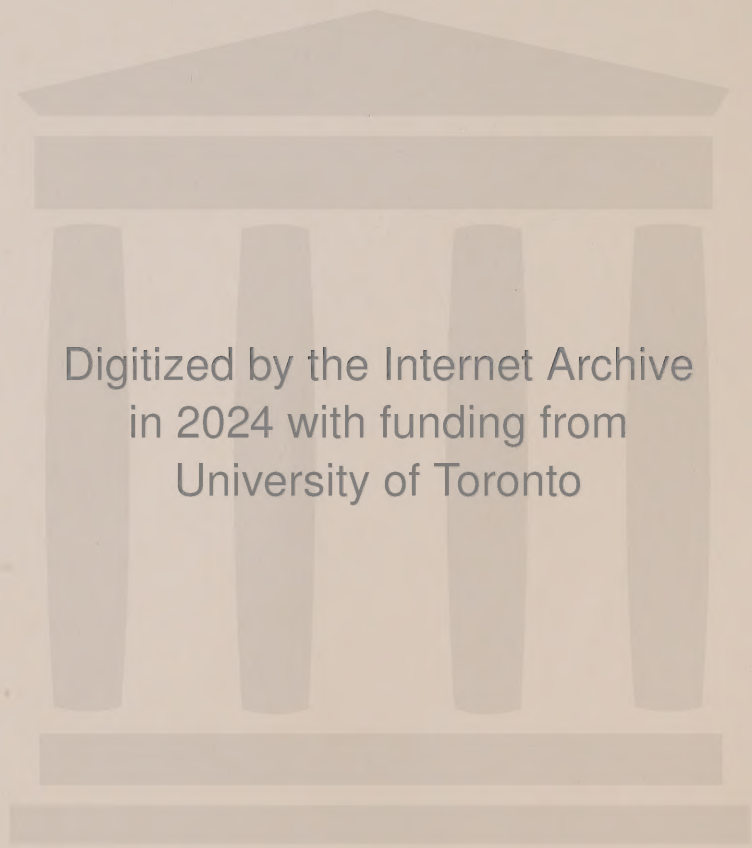
QUEBEC HARBOUR TO KINGSTON HARBOUR

including

RICHELIEU AND OTTAWA RIVERS

SECOND EDITION 1955

ISSUED BY
THE CANADIAN HYDROGRAPHIC SERVICE
SURVEYS AND MAPPING BRANCH
DEPARTMENT OF MINES AND TECHNICAL SURVEYS
OTTAWA



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Obtainable on payment of $2.50 from the Queen's Printer, Ottawa

60718—1

The following descriptions and directions, published under the authority of the Government of Canada, form the second edition of the St. Lawrence River Pilot from Quebec Harbour to Kingston Harbour, including the Ottawa River from Montreal to Ottawa, and the Richelieu River.

This edition, prepared by Capt. C. J. Angus, has been compiled from Canadian information supplemented by the latest United States Government charts and publications. This work embodies all "Notices to Mariners", referring to the district, up to and including No. 128 of 1955.

Pilots, masters or others interested are earnestly requested to furnish information regarding newly discovered dangers, changes in aids to navigation, the existence of new shoals or channels, errors in publications, or other information that, it is considered, would be useful for the correction of Nautical Charts and Hydrographic Publications affecting Canadian waters to the

DOMINION HYDROGRAPHER,
CANADIAN HYDROGRAPHIC SERVICE,
SURVEYS AND MAPPING BRANCH,
DEPARTMENT OF MINES AND TECHNICAL SURVEYS
No. 8 TEMPORARY BUILDING,
OTTAWA, CANADA

CONTENTS

60718—1½

NOTICE

This volume should not be used without reference to the latest Supplement and Notices to Mariners affecting it which may have been published.

A Supplement to this volume is published periodically, until the latter is again taken up for revision, and can be obtained gratuitously by purchasers of this volume.

After the publication of Supplement No. 1, each succeeding supplement cancels the former.

The publication of all Supplements is announced in Canadian Notices to Mariners.

CAUTION

BEARINGS in this work are true unless otherwise stated, and where given in degrees, they are reckoned clockwise from 000° (NORTH) to 359°.

The **bearings of lights** are given from **seaward.**

The **DISTANCES** are expressed in nautical miles of 60 to a degree of latitude, from Quebec Harbour to Montreal Harbour.

To avoid any possible confusion with the system adopted in the United States Government Sailing Directions for the lakes, the distances from Montreal to Kingston are given in statute or land miles of 1,760 yards, eight of which are approximately equivalent to 7 nautical miles of 2,025 yards, as represented on the east and west margins of the chart. The longer distances, however, have the equivalents in nautical miles bracketed with them.

A **cable's length** is assumed to be equal to the tenth part of a nautical mile, 100 fathoms (182^{m}9) or 200 yards (182^{m}9).

For the **VARIATION** the chart should be consulted.

The **DEPTHS** are given below chart datum where not otherwise stated.

HEIGHTS on land are given above the highest normal tide, from Quebec to the head of Lake St. Peter, and from the latter place to Montreal, above chart datum.

The **DATUMS** for the soundings mentioned herein are as follows:—

Between Quebec and Champlain, the soundings are reduced to a plane one foot below the adjusted 1897 low water datum. The adjusted 1897 low water datum corresponds to lowest normal tides, or to approximately 7$\frac{3}{4}$ feet (2^{m}3) on the sill of Levis dry dock.

Between Champlain and Montreal, the soundings are reduced to the adjusted 1897 low water datum, which, at Montreal, corresponds to 12$\frac{3}{4}$ feet (3^{m}9) on the lower sill of old lock No. 1 (the northwestern of the two entrance locks of Lachine Canal).

For the Richelieu River, the soundings are reduced to:—Sorel Harbour—The adjusted 1897 low water datum. Above Sorel to St. Ours lock—12 feet (3^{m}7) on the lower sill of St. Ours new lock. St. Ours lock to Chambly Basin—11$\frac{1}{4}$ feet (3^{m}4) on upper sill of St. Ours new lock, or 6$\frac{1}{4}$ feet (1^{m}8) on lower sill of lock No. 1, Chambly Canal. St. Johns to Lake Champlain—6 feet (1^{m}8) on upper sill of lock No. 9, Chambly Canal.

Figures in parentheses after those denoting feet, fathoms and yards, are their equivalents in metres.

More detailed information as to lights, buoys, and other aids to navigation may be obtained from the various publications issued by the Department of Transport, and referring to this district.

For **Lake St. Louis** between Lachine and Soulanges Canal, the soundings are reduced to an elevation of 66·46 feet above Mean Sea Level and correspond to 15·5 feet above the entrance sill of lock No. 1, Soulanges Canal, 13·5 feet above the upper entrance sill of new lock No. 5, Lachine Canal and 9 feet above the lower entrance sill of the new lock, Ste. Anne Canal.

For **Lake St. Francis** the soundings are reduced to a Low Water datum which at Coteau Landing is 150·97 feet above Mean Sea Level and 15·99 feet above the upper entrance sill of lock No. 5, Soulanges Canal.

For the **St. Lawrence River** between **Cornwall** and **Kingston,** the soundings are reduced to Standard Low Water adopted by Canada and the United States, which corresponds to the sloping surface of the river when Lake Ontario is at an elevation of 243·00 feet above Mean Sea Level.

For **Lake of Two Mountains** the soundings are reduced to a Low Water datum which at Ste Anne is 68·57 feet above Mean Sea Level and 9 feet above the upper entrance sill of the new lock; at Carillon the datum is 9 feet above the lower entrance sill of lock No. 1, Carillon Canal.

For the **Ottawa River** between **Carillon** and **Grenville,** the soundings are reduced to the sloping surface of the water at Extreme Low Water observed in 1922 and correspond to a depth of 9·8 feet of water on the upper mitre sill of lock No. 2, Carillon Canal and 11·99 feet on the lower mitre sill of lock No. 3, Grenville Canal.

For the **Ottawa River** between **Grenville** and **Ottawa,** the soundings are reduced to the sloping surface of the river at Extreme Low Water observed in 1881 and correspond to a depth of 4·5 feet of water on the lower mitre sill of the lower entrance lock at the Rideau Canal, and 8·9 feet on the upper mitre sill at the upper entrance lock of the Grenville Canal.

NOTE

For information regarding the vertical movements of the water, the "Tide Tables for the Atlantic Coast of Canada", published annually by the Hydrographic Service, Department of Mines and Technical Surveys, Ottawa, should be consulted.

TABLE OF POINTS AND DEGREES

Points	° ′	Points	° ′	Points	° ′
North	0 0	N.N.E.$\frac{3}{4}$E	30 56	N.E. by E.$\frac{1}{2}$E	61 52
N.$\frac{1}{8}$E	1 24	N.N.E.$\frac{7}{8}$E	32 20	N.E. by E.$\frac{5}{8}$E	63 17
N.$\frac{1}{4}$E	2 49	N.E. by N	33 45	N.E. by E.$\frac{3}{4}$E	64 41
N.$\frac{3}{8}$E	4 13	N.E.$\frac{1}{8}$N	35 09	N.E. by E.$\frac{7}{8}$E	66 05
N.$\frac{1}{2}$E	5 37	N.E.$\frac{1}{4}$N	36 34	E.N.E	67 30
N.$\frac{5}{8}$E	7 02	N.E.$\frac{3}{8}$N	37 58	E. by N.$\frac{7}{8}$N	68 54
N.$\frac{3}{4}$E	8 26	N.E.$\frac{1}{2}$N	39 22	E. by N.$\frac{3}{4}$N	70 19
N.$\frac{7}{8}$E	9 50	N.E.$\frac{5}{8}$N	40 47	E. by N.$\frac{5}{8}$N	71 43
N. by E	11 15	N.E. $\frac{3}{4}$N	42 11	E. by N.$\frac{1}{2}$N	73 07
N. by E.$\frac{1}{8}$E	12 39	N.E.$\frac{1}{8}$N	43 35	E. by N.$\frac{3}{8}$N	74 32
N. by E.$\frac{1}{4}$E	14 04	N.E.	45 00	E. by N.$\frac{1}{4}$N	75 56
N. by E.$\frac{3}{8}$E	15 28	N.E.$\frac{1}{8}$E	46 24	E. by N.$\frac{1}{8}$N	77 20
N. by E.$\frac{1}{2}$E	16 52	N.E.$\frac{1}{4}$E	47 49	E. by N	78 45
N. by E.$\frac{5}{8}$E	18 17	N.E.$\frac{3}{8}$E	49 13	E.$\frac{7}{8}$N	80 09
N. by E.$\frac{3}{4}$E	19 41	N.E.$\frac{1}{2}$E	50 37	E.$\frac{3}{4}$N	81 34
N. by E.$\frac{7}{8}$E	21 05	N.E.$\frac{5}{8}$E	52 02	E.$\frac{5}{8}$N	82 58
N.N.E	22 30	N.E.$\frac{3}{4}$E	53 26	E.$\frac{1}{2}$N	84 22
N.N.E.$\frac{1}{8}$E	23 55	N.E.$\frac{7}{8}$E	54 50	E.$\frac{3}{8}$N	85 47
N.N.E.$\frac{1}{4}$E	25 19	N.E. by E	56 15	E.$\frac{1}{4}$N	87 11
N.N.E.$\frac{3}{8}$E	26 43	N.E. by E $\frac{1}{8}$E	57 39	E.$\frac{1}{8}$N	88 35
N.N.E.$\frac{1}{2}$E	28 07	N.E. by E $\frac{1}{4}$E	59 04	East	90 00
N.N.E.$\frac{5}{8}$E	29 32	N.E. by E.$\frac{3}{8}$E	60 29		

Similarly with the other quadrants.

CONVERSION TABLE

FATHOMS TO METRES

Fathoms	Metres	Fathoms	Metres	Fathoms	Metres
¼	0·5	3¾	6·9	7½	13·7
½	0·9	4	7·3	8	14·6
¾	1·4	4¼	7·8	8½	15·5
1	1·8	4½	8·2	9	16·5
1¼	2·3	4¾	8·7	10	18·3
1½	2·7	5	9·1	20	36·6
1¾	3·2	5¼	9·6	30	54·9
2	3·7	5½	10·1	40	73·2
2¼	4·1	5¾	10·5	50	91·4
2½	4·6	6	11·0	60	109·7
2¾	5·0	6¼	11·4	70	128·0
3	5·5	6½	11·9	80	146·3
3¼	5·9	6¾	12·3	90	164·6
3½	6·4	7	12·8	100	182·9

FEET TO METRES

Feet	Metres	Feet	Metres	Feet	Metres
1	0·3	11	3·4	21	6·4
2	0·6	12	3·7	22	6·7
3	0·9	13	4·0	23	7·0
4	1·2	14	4·3	24	7·3
5	1·5	15	4·6	25	7·6
6	1·8	16	4·9	26	7·9
7	2·1	17	5·2	27	8·2
8	2·4	18	5·5	28	8·5
9	2·7	19	5·8	29	8·8
10	3·0	20	6·1	30	9·1

Table I.—DISTANCES BETWEEN POINTS ON GREAT LAKES

(From U.S. Government Publications)

		30 Montreal	29 Ogdensburg	28 Kingston	27 Toronto	26 Oswego	25 Rochester	24 Port Colborne	23 Buffalo	22 Erie	21 Conneaut	20 Ashtabula	19 Cleveland	18 Toledo	17 Detroit	16 Port Huron	15 Midland	14 Collingwood	13 Goderich	12 Bay City	11 Alpena	10 Muskegon	9 Chicago	8 Milwaukee	7 Green Bay	6 Sault Ste Marie	5 Marquette	4 Houghton	3 Ashland	2 Duluth
1	Port Arthur	1212	1094	1034	903	1016	965	848	864	795	768	754	711	658	604	542	539	531	506	505	410	587	686	621	560	273	171	116	164	195
2	Duluth	1334	1216	1156	1025	1138	1087	970	986	917	890	876	833	781	726	664	661	653	628	627	532	709	808	743	682	394	261	179	93	
3	Ashland	1288	1170	1110	979	1092	1041	924	941	871	844	830	788	734	680	618	616	608	583	581	486	663	763	698	637	349	213	131		
4	Houghton	1160	1042	982	851	964	913	796	813	743	716	702	659	606	552	490	488	480	455	453	358	535	635	570	509	221	84			
5	Marquette	1099	981	921	790	903	852	735	751	682	655	641	598	545	491	429	426	418	393	391	297	474	573	508	447	159				
6	Sault Ste. Marie[1]	939	821	761	630	743	692	575	592	522	495	481	438	385	331	269	267	259	234	232	137	314	414	349	288					
7	Green Bay	1115	997	937	806	919	868	751	767	698	671	657	614	561	507	445	452	444	409	407	313	171	255	180						
8	Milwaukee	1176	1058	998	867	980	929	812	828	759	732	718	675	622	568	506	513	505	470	468	374	80	85							
9	Chicago	1241	1123	1063	932	1045	994	877	893	824	797	783	740	688	633	571	578	570	535	534	439	114								
10	Muskegon	1141	1023	963	832	945	894	777	794	724	697	683	640	587	533	471	479	471	435	434	339									
11	Alpena	827	709	649	518	631	580	463	479	410	383	369	326	273	219	157	193	185	124	116										
12	Bay City	832	714	654	523	636	585	468	484	415	388	374	331	278	224	162	265	257	137											
13	Goderich	735	617	557	426	539	488	371	387	318	291	277	234	181	127	65	211	207												
14	Collingwood	928	810	750	619	732	681	564	580	511	484	470	427	374	320	258	55													
15	Midland	936	818	758	627	740	689	572	588	519	492	478	435	382	328	266														
16	Port Huron[2]	670	552	492	361	474	423	306	322	253	226	213	170	116	62															
17	Detroit (Woodward Ave.)	608	490	430	299	412	361	244	261	191	164	150	108	54																
18	Toledo (river mouth)	601	483	423	292	405	354	237	254	185	157	144	96																	
19	Cleveland (main entrance)	524	406	346	215	328	277	160	176	102	73	59																		
20	Ashtabula	468	350	290	159	272	221	104	119	45	15																			
21	Conneaut	456	338	278	147	260	209	92	107	33																				
22	Erie	429	311	251	120	233	182	65	78																					
23	Buffalo (north entrance)	386	268	208	77	190	139	22																						
24	Port Colborne	364	246	186	55	168	117																							
25	Rochester	266	147	89	95	59																								
26	Oswego	227	108	55	145																									
27	Toronto	338	219	161																										
28	Kingston	182	63																											
29	Ogdensburg	120																												
30	Montreal	0																												

[1] From abreast east end of U.S. centre pier.
[2] From foot of Grand River Ave.

EXPLANATION

Distances in these tables are expressed to the nearest even statute mile; fractions of ½ mile or more being taken as a full mile and those under the half dropped. The results are, therefore, at times inconsistent by 1 mile in their comparative differences. Thus, measured distances to two points given may differ uniformly by 0·8 mile; if the respective distances to the two points from a certain port measure 116·0 and 115·2, they appear in the table as 116 and 115, a difference of 1 mile, whereas from the next port listed, the distances to the same two points may measure 105·4 and 104·6, and both will appear in the table as 105.

Measurements are by the shortest marked or safe direct courses, starting (unless otherwise noted) from the main entrances between pierheads of breakwaters or piers, or from the principal landings of open roadsteads. Where landings are appreciably remote from protected entrances, the appropriate further distances, if desired, may be ascertained from the harbour descriptions or from charts.

Points in this table are arranged in the order of their location on the several lakes in the following sequence: Lake Superior, Lake Michigan, Lake Huron, Lake Erie, and Lake Ontario.

The distance between any two points appears in the line extending horizontally from the point first in order in the list and in the column headed by the other point.

Table II.—DISTANCES BETWEEN POINTS ON LAKE ONTARIO AND ST. LAWRENCE RIVER

(From U.S. Government Publications)

		31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
		Montreal	Lachine Canal	Soulanges Canal	St. Regis	Cornwall	Cornwall Canal	Farran Point Canal	Rapide Plat Canal	Galop Canal	Ogdensburg	Brockville	Alexandria Bay	Thousand Island Park	Clayton	Gananoque	Kingston	Picton	Deseronto	Belleville	Trenton	Cobourg	Port Hope	Toronto	Hamilton	Port Weller	Niagara-on-the-Lake	Rochester	Oswego	Sacketts Harbour	Cape Vincent
1	Port Colborne	364	355	325	298	294	283	278	264	253	246	234	213	207	202	205	186	173	160	144	135	100	95	55	57	27	39	117	168	192	187
2	Cape Vincent	178	169	139	112	108	97	91	78	66	60	48	27	20	16	19	24	45	51	67	78	101	106	160	186	160	154	89	49	26	
3	Sacketts Harbour	204	195	165	138	134	123	117	103	92	86	74	53	46	42	45	36	56	61	78	88	106	112	165	191	165	158	88	41		
4	Oswego	226	217	188	161	157	146	140	127	115	109	97	76	69	65	68	55	66	71	88	82	91	96	145	166	141	133	59			
5	Rochester (Charlotte)	266	257	227	200	196	185	179	166	154	148	136	115	108	104	107	90	98	89	73	64	57	60	96	117	89	83				
6	Niagara-on-the-Lake	331	321	292	265	261	250	244	231	219	213	201	180	173	169	172	154	141	128	111	102	66	63	30	30	11					
7	Port Weller	337	327	298	271	267	256	250	237	225	219	207	186	179	175	178	159	146	133	117	107	72	68	28	30						
8	Hamilton	362	353	324	297	292	282	276	262	251	244	232	211	205	200	204	185	169	156	140	131	94	88	*30							
9	Toronto (east entrance)	337	328	298	271	267	256	250	237	226	219	207	186	180	175	179	160	142	129	112	103	65	60								
10	Port Hope	283	274	245	182	214	203	197	183	172	166	154	132	126	121	125	106	85	72	56	47	7									
11	Cobourg	278	269	239	212	208	197	191	178	167	160	148	127	120	116	120	101	79	67	50	41										
12	Trenton	250	241	211	184	180	169	163	150	139	132	120	101	94	90	89	71	40	28	11											
13	Belleville	239	230	201	174	169	158	153	139	128	121	109	90	84	80	78	60	29	17												
14	Deseronto	223	214	184	157	153	142	136	123	111	105	93	74	68	63	62	44	13													
15	Picton	217	208	178	151	147	136	130	117	105	99	87	68	62	57	56	37														
16	Kingston	181	171	142	115	110	100	94	80	69	62	50	32	25	21	19															
17	Gananoque	162	153	124	97	92	81	76	62	51	44	32	18	11	10																
18	Clayton	162	153	124	97	92	81	75	62	51	44	32	11	4																	
19	Thousand Island Park	159	150	120	93	89	78	72	59	47	41	29	8																		
20	Alexandria Bay	152	142	113	86	81	71	65	51	40	33	22																			
21	Brockville	130	121	92	65	60	49	44	30	19	12																				
22	Ogdensburg	118	109	80	53	48	37	32	18	7																					
23	Galop Canal[1]	111	102	73	46	41	30	25	11																						
24	Rapide Plat Canal[1]	100	91	62	35	30	19	13																							
25	Farran Point Canal[1]	87	78	48	21	17	6																								
26	Cornwall Canal[1]	81	72	42	15	11																									
27	Cornwall	70	61	32	5																										
28	St. Regis	67	58	29																											
29	Soulanges Canal[1]	38	29																												
30	Lachine Canal[1]	9																													
31	Montreal	0																													

[1] From upper end of canal.
* To Toronto west entrance.

EXPLANATION

Explanation generally applicable to both tables is published in Table I.

Points in this table are arranged in geographical sequence proceeding westward along the south shore and returning eastward along the north shore of the lake and down St. Lawrence River.

For determining distances to points located in other lakes, distances from all places listed in this table are given to the initial point No. 1, which also appears in Table I. The through distance from a given point in this table to a given point in Table I is the sum of the respective distances to each given point from the initial point which is common to the two tables. Thus, Port Colborne being the common point for determining distances from Lake Ontario and St. Lawrence River points to points in Lake Superior, a through distance would be derived as follows:

Port Colborne to Cornwall	294
Port Colborne to Port Arthur	848
Cornwall to Port Arthur	1,142

NOTES CONCERNING CHARTS, LIST OF LIGHTS, SAILING DIRECTIONS, AND ON SUBJECTS OF GENERAL INTEREST TO MARINERS

In the following general notes, acknowledgment of indebtedness must be made to the Admiralty publications of a similar nature.

The principal published guides to navigation—the Charts, the Sailing Directions, Tide and Current Tables, List of Lights and Fog Signals, List of Radio Stations—are all affected by the continual changes and alterations that take place, and mariners and owners are cautioned to use only the latest and corrected official editions of these publications.

All charts are corrected from the latest information received in the Hydrographic Office, to date of publication, or date of corrections, as given in the lower left-hand corner.

The Light Lists and other guides mentioned above, should be consulted for changes made after the chart was issued. The Sailing Directions, however, cannot from their nature be so corrected, and in all cases, where they differ from charts of later date, the latter must be taken as the guide.

When navigating narrow channels, approaching or entering harbours, or other restricted passages, the large scale charts of such waters should be used.

Corrections from Supplements.—Notations referring to the Supplements should be made on the pages of the Sailing Directions affected.

Corrections from Notices to Mariners.—All small but important corrections, that can be made by hand, are published in "Notices to Mariners", and masters should at once place them on the charts to which they refer; when large corrections become necessary a new edition of the chart is issued. These new editions are issued principally because of changes in depths, channels, or in aids to navigation, and it is both dangerous and reprehensible to continue the use of the old charts.

In a communication with Hydrographic Offices concerning charts, the number of the chart (which will be found in the lower right-hand corner) should be given, as well as the date of publication (found below the lower margin) and dates of corrections, that the edition referred to may be known.

The **Canadian Lists of Lights and Fog Signals** are published annually, about March 1 of each year. Alterations that take place after issue are notified to the public, and such alterations should be immediately noted in lists and on charts.

The Lists of Lights should always be consulted as to the details of a light, as the description in the Sailing Directions or on the chart may be obsolete, in consequence of changes made since publication.

The **Sailing Directions** are not corrected between issues, except occasionally for very important new rocks or dangers. "Notices to Mariners" referring to each volume are published from time to time.

When "Notices to Mariners" have accumulated since the last revision of the Sailing Directions, a supplement may be issued. This supplement will contain all notices issued and notes as to cancellation of certain portions of the edition of Sailing Directions to which they refer.

Whenever Charts, Sailing Directions or Lists of Lights are corrected by hand, a note to that effect should be written on margin with date and authority for the correction.

The Use of Charts as Navigational Aids, and General Remarks Relating to Practical Navigation

1. Accuracy of a Chart.—The value of a chart must manifestly depend upon the accuracy of the survey on which it is based, and this becomes more important the larger is the scale of the chart.

To estimate this, the date of the survey, which is always given in the title, is a good guide. Besides the changes that, in waters where sand or mud prevails, may have taken place since the date of the survey, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail, and, until a plan founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well frequented harbours and their approaches, no surveys yet made have been so minute in their examination of the bottom as to make it certain that all dangers have been found. The fullness or scantiness of soundings is another indication as to whether a chart is complete. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not made in great detail.

Close examination by soundings is the only method by which surveys on a large scale can generally be made, and in view of the vast mileage of surveys yet requiring completion in the interest of navigation it would be a waste of time to undertake large scale coast surveys.

Blank spaces and irregular gaps among soundings on old charts mean that no soundings have been obtained in these spots. When the surrounding soundings are deep it may with fairness be assumed that, in the blanks, the water is also deep; but when they are shallow, or it can be seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case on rocky coasts, and it should be remembered, that in waters where rocks abound, it is always possible that a survey, however complete and detailed, may have failed to find every small patch.

A wide berth should therefore be given to every rocky shore or patch, and *this rule should be invariably followed, viz., that instead of considering a coast to be clear, unless it is shown to be foul, the contrary should be assumed.*

2. Fathom Lines, a Caution.—Except in plans of harbours that have been surveyed in detail, the five-fathom line (in some recent editions the six-fathom line) on most charts is to be considered as a caution or danger line against unnecessarily approaching the shore or bank within that line, on account of the possibility of the existence of undiscovered inequalities of the bottom, which nothing but an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for such a detailed survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The ten-fathom line is, on rocky shores, another warning, especially for ships of heavy draught.

Charts where no fathom lines are marked must be specially regarded with caution, as it generally means that soundings were too scanty and the bottom too uneven to enable them to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed around, as there is no knowing how closely the spot may have been examined.

On charts the areas tinted blue indicate shoal and dangerous waters, which should always be navigated with extreme caution.

3. Chart on largest scale always to be used.—It sometimes happens that, from press of work, only the larger scale chart of a particular locality can at once receive any extensive rearrangement of coastline or soundings. This is an additional reason, besides the obvious one of the greater detail shown on such chart, why largest scale charts should always be used for navigation.

4. Caution in using Small Scale Charts.—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large scale, whereas on a small scale the same amount of displacement means large fractions of a mile. This is particularly to be observed when coming to anchor on a narrow ledge of convenient depth at some distance from the shore.

For the same reason, bearings to objects *near* should be used in preference to objects farther off, although the latter may be more prominent, as a small error in a bearing, or in laying it down on the chart, has a greater effect in misplacing the position the longer the line to be drawn.

5. Buoys.—It is manifestly impossible that any reliance can be placed on buoys always maintaining their exact positions. Buoys should therefore be regarded as warnings and not as infallible navigation marks, especially when in exposed positions, and a ship should always, when possible, be navigated by bearings or angles on fixed objects on shore and not by buoys.

Light-buoys.—The light shown by light-buoys cannot be implicitly relied upon.

6. Lights.—Circles drawn on charts around a light are not intended to give information as to the distance at which it can be seen, but solely to indicate, in the case of lights which do not show equally in all directions, the bearings between which the variation, or visibility, or obscuration of the light occurs.

All the distances given in the Lists of Lights and on the charts for the visibility of lights are calculated for a height of an observer's eye of 15 feet. The table of distances visible due to height, at the beginning of each List of Lights affords a means of ascertaining how much more or less the light is visible should the height of the observer's eye be more or less than 15 feet. The glare of a powerful light is often seen beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Again, refraction may often cause a light to be seen farther than under ordinary circumstances.

When looking for a light at night, the fact is often forgotten that from aloft the range of vision is much increased. By noting a star immediately over the light, a very correct bearing may be afterwards obtained from the standard compass.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

Coloured lights are also inferior in power to *white* lights, and are more quickly lost under unfavourable circumstances. In some conditions of the atmosphere, white lights may have a reddish hue. The mariner should not trust solely to colour where there are sectors, but verify the position by taking a bearing on the light. On either side of the line of demarcation, between *white* and *red*, and also between *white* and *green*, there is always a small arc of uncertain colour.

The power of a light can be estimated by remarking its order, as given in the List of Lights, and in some cases by noting how much its visibility in clear weather falls short of the range due to the height at which it is placed. Thus, a light standing 200 feet above the sea, and only recorded as visible at 10 miles

in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles, if of any power. (*See* table in Lists of Lights above mentioned.)

The distance from a light cannot be estimated either by its brilliancy or its dimness.

7. Fog Signals.—Sound is conveyed in a very capricious way through the atmosphere. Apart from wind, large areas of silence have been found in different directions and at different distances from the fog signal station, in some instances even when in close proximity to it. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly towards the land, and is not observed by the people at a station until it is upon them; whereas a ship may have been for many hours in it, and approaching the land. In such a case no signal may be made. When sound has to travel against the wind, it may be thrown upwards; in such a case, a man aloft might hear it when it is inaudible on deck. Under certain conditions of the atmosphere, when a fog signal is a combination of high and low notes, one of the notes may be inaudible.

The mariner should not assume—

(*a*) That he is out of hearing, because he fails to hear the sound.

(*b*) That because he hears a fog signal faintly, that he is at a great distance from it.

(*c*) That he is near it, because he hears the sound plainly.

(*d*) That the distance from and the intensity of the sound on any one occasion is a guide to him for any future occasion.

(*e*) That the fog signal has ceased sounding, because he does not hear it even when in close proximity.

Taken together, these facts should induce the utmost caution in closing the land in fogs, and the use of the lead should not be neglected.

8. Tides and Tidal Streams.—In navigating the coasts where the tidal range is considerable, caution is always necessary. It should be remembered that there are indraughts to all bays and bights, although the general run of the stream may be parallel to the shore.

The turn of the tidal stream offshore is seldom coincident with the time of high and low water on shore. In open channels, the tidal stream ordinarily overruns the turn of the vertical movement of the tide by about three hours, forming what is usually known as tide and half tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

On coasts where there is much diurnal inequality in the tides, the amount of rise and fall can never be depended upon, and additional caution is necessary.

It should be remembered that the tide may fall below datum; where diurnal inequality is great the lowest tides may be expected with coincidence of new or full moon at perigee and maximum declination, particularly when occurring near the solstices. Wind or a high barometer may also reduce the height of the tide and cause it to fall below datum.

Caution.—From the above remarks it will be seen that the depths shown on charts are not always the least depths that will be found to exist, due to the fact that the level of the chart datum is, in most cases, above the level to which the tide may fall at times.

9. Change of Variation of the Compass.—The gradual change in the variation must not be forgotten in laying down positions by bearing on charts. The magnetic compass placed on the charts for the purpose of facilitating

plotting become in time slightly in error, and in some cases, such as with small scales, or when the lines are long, the displacement of position from neglect of this change may be of importance.

In the neighbourhood of Kingston, there is an area of magnetic disturbance extending from about a mile above Bayfield Shoal to Snake Island, and from the harbour front to Garden Island. In this area the variation changes 45° in about a mile.

10. Arrows on charts only show the most usual or the mean direction of a tidal stream or current. It must never be assumed that the direction of a stream will not vary from that indicated by the arrow. In the same manner, the rate of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

11. Fixing Position.—The most accurate method of fixing a position, relative to the shore, is by angles taken by the sextant between well defined objects and laid down on the chart by station pointer.

Three things are, however, necessary to its successful employment. First that the objects be well chosen; second, that the observer is skilful and rapid in his use of the sextant, and third, that the chart being used is from an accurate survey.

For the first, reference can be had to the pamphlet on the use of the station-pointer, the second can only be obtained by practice. The third can be judged by the data in the title.

In many narrow waters also, where the objects may yet be at some distance, as in coral harbours or narrow passages among mud banks, navigation by sextant and station-pointer is invaluable, as a true position can only be obtained by their means. A small error in either taking or plotting a compass bearing, in such circumstances, may put the ship ashore.

It is not intended that the use of the compass to fix the ship should be given up; there are many circumstances in which it may be usefully employed, but errors more readily creep into a position so fixed. Angles should invariably be used in all cases where great accuracy of position is desired, such as the fixing of a rock or shoal, or of additions to a chart, such as fresh soundings or new buildings. In these cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself.

Sometimes, when only two objects are visible, a compass bearing and a sextant angle may be used with advantage.

The use of a danger angle in passing outlying rocks with land behind should not be forgotten. In employing this method, however, caution is necessary as should the chart be not accurate, i.e., should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not, therefore, be employed when the survey is old or manifestly imperfect.

In fixing by the compass, it must always be remembered that two bearings only are liable to error. An absolute error may be made in either bearing observed; errors may be made in applying the deviation; or errors may creep in in laying them on to the chart. For these reasons, a third or check bearing of some other object should be taken, especially when near the shore or dangers. The coincidence of these three lines will prevent any mistakes.

In passing near a point of land, or an island or any conspicuous object, the method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "four-point bearing," when the bearing is taken four

points on the bow, and on the beam, the distance from the object at the latter position being the distance run between the times of taking the bearings, gives an excellent fix for a departure, but does not ensure safety, as the point, and probably the rocks off it, are abeam before the position is obtained.

Doubling the angle on the bow cannot be used, in its simple form, if there is any tidal stream, current or leeway across the course, that is, if the course made good is not the course steered. If this happens, the observations must be plotted as a running fix.

By taking the bearings of an object, when two and four points, three and six points, or any doubled angle on the bow, and the distance made good in the interval, a very good position is obtained at the time of the second bearing—the distance from the object being, as with the "four-point bearing", equal to the distance run. This method has an advantage over those following, in that no tables are necessary for the working out of the distance off at second bearing. Used in conjunction with the Traverse table, the distance the ship will pass off the object when abeam can be obtained, as follows:

Taking the degrees, or points, from bow at second bearing as a course, with the distance made good in distance column, in dep. column will be found the distance the ship will pass off when abeam—*provided the course is maintained.*

The advantage of having this knowledge before coming up to a point is obvious.

Another method of obtaining the distance the ship will pass off an object is shown in the following table:

Angles on bow				
Between	22°	and	34°	
"	25°	"	41°	
"	26½°	"	45°	The distance made good will be distance ship will pass off.
"	32°	"	59°	
"	37°	"	72°	
"	45°	"	90°	
"	45°	"	63½°	The distance made good will be *half* the distance she will pass off.

A very useful table is here inserted. If two bearings of an object are taken and the distance run in the interval between the two bearings (allowance being made for tide, etc.) is known, this distance, multiplied by the factors in the table, will give the distance the ship is off at the second bearing, and will also give the distance the ship will pass when at her nearest, *i.e.*, when abeam. This table can, of course, also be used to obtain distance from an object abaft the beam and so distance when object was abeam.

Example.—Course, North. Speed 10 knots.

9.00 p.m. observed Tonken Lt. bearing N.N.E. patent log 18·0.

9.30 a.m. observed Tonken Lt. bearing N.E. by E. ½ E. patent log 23·0.

Difference between course and first bearing is 2 points.

Difference between course and second bearing is 5½ points.

Distance run in the interval, 5 miles.

Under 2 (difference between course and first bearing) and in line with 5½ (difference between course and second bearing) will be seen the factors ·60 and ·53. Multiply these factors by distance run.

·6 x 5=3·0 m. distance from lighthouse at 2nd bearing.

·53 x 5=2·65 m. distance ship will pass off lighthouse when abeam *provided the course is maintained.*

It must be remembered that distance run, is distance *made good*, and the course must be the same throughout.

When the object is abeam the vessel is at her nearest, therefore the smaller of the two results always give the distance off the ship will be, or was, when abeam. 5

DISTANCE OF AN OBJECT BY TWO BEARINGS, AND DISTANCE RUN BETWEEN THEM

Difference in Points Between Course and Second Bearing	Difference in Points Between the Course and First Bearing											
	2		2½		3		3½		4		4½	
3	1·96	1·09										
3½	1·32	·84	2·42	1·53								
4	1·00	·71	1·62	1·15	2·85	2·01						
4½	·81	·63	1·23	·95	1·91	1·48	3·25	2·51				
5	·69	·57	1·00	·83	1·45	1·21	2·19	1·82	3·62	3·01		
5½	·60	·53	·85	·75	1·18	1·01	1·66	1·46	2·44	2·15	3·96	3·49
6	·54	·50	·74	·69	1·00	·92	1·35	1·24	1·85	1·71	2·66	2·46
6½	·50	·47	·67	·64	·88	·84	1·14	1·09	1·50	1·44	2·02	1·93
7	·46	·45	·61	·60	·79	·77	1·00	·98	1·27	1·25	1·64	1·61
7½	·43	·43	·57	·56	·72	·72	·90	·89	1·11	1·11	1·39	1·38
8	·41	·41	·53	·53	·67	·67	·82	·82	1·00	1·00	1·22	1·22
8½	·40	·40	·51	·51	·63	·63	·76	·76	·91	·91	1·09	1·09
9	·39	·38	·49	·48	·60	·59	·72	·71	·85	·83	1·00	·98
9½	·38	·37	·48	·46	·58	·56	·69	·66	·83	·77	·93	·89
10	·38	·35	·47	·44	·57	·52	·66	·61	·77	·71	·88	·81
10½	·38	·34	·47	·42	·56	·49	·65	·57	·74	·65	·84	·74
11	·39	·32	·47	·39	·56	·46	·64	·53	·72	·60	·81	·67
11½	·40	·31	·48	·37	·56	·43	·63	·49	·71	·55	·79	·61
12	·41	·29	·49	·35	·57	·40	·64	·45	·71	·50	·78	·55
	5		5½		6		6½		7		7½	
6	4·26	3·94										
6½	2·86	2·74	4·52	4·33								
7	2·17	2·13	3·04	2·98	4·74	4·64						
7½	1·76	1·76	2·30	2·29	3·18	3·17	4·91	4·88				
8	1·50	1·50	1·87	1·87	2·41	2·41	3·30	3·30	5·03	5·03		
8½	1·31	1·30	1·59	1·58	1·96	1·95	2·50	2·49	3·38	3·36	5·10	5·08
9	1·18	1·15	1·39	1·36	1·66	1·63	2·03	1·99	2·56	2·51	3·43	3·36
9½	1·08	1·03	1·25	1·19	1·46	1·39	1·72	1·65	2·08	1·99	2·60	2·49
10	1·00	·92	1·14	1·05	1·31	1·21	1·51	1·39	1·77	1·63	2·11	1·95
10½	·94	·83	1·06	·94	1·20	1·05	1·35	1·19	1·55	1·36	1·79	1·58
11	·90	·75	1·00	·83	1·11	·92	1·24	1·03	1·39	1·15	1·57	1·39
11½	·87	·67	·95	·73	1·05	·81	1·15	·89	1·27	·98	1·14	1·09
12	·85	·60	·92	·65	1·00	·71	1·09	·77	1·18	·83	1·29	0·91
	8		8½		9		9½		10		10½	
9	5·13	5·03										
9½	3·44	3·30	5·10	4·88								
10	2·61	2·41	3·43	3·17	5·03	4·64						
10½	2·12	1·87	2·60	2·29	3·38	2·98	4·91	4·33				
11	1·80	1·50	2·11	1·76	2·56	2·13	3·30	2·74	4·74	3·94		
11½	1·58	1·22	1·79	1·38	2·08	1·61	2·50	1·93	3·18	2·46	4·52	3·49
12	1·41	1·00	1·57	1·11	1·77	1·25	2·03	1·44	2·41	1·71	3·04	2·15

The radio position line.—A number of radio systems of which the principal ones are M/F D/F Radio Beacons, Consol Beacons, Loran, Gee and Decca, are now in general use from which position lines or fixes may be obtained.

The accuracy and range which may be obtained from these systems vary considerably; their great advantage over other methods lies in the fact that they can be employed under all weather and visibility conditions, though in some cases the results obtained will vary between day and night.

Special receiving equipment is generally required in order to make use of the radio signal, and some systems require special lattice charts or tables for plotting the position lines. Full details of these systems and their coverage areas are contained in Admiralty List of Radio Signals, Volume II.

The mariner should appreciate that with the position-fixing systems the accuracy of a fix will depend on three factors:—

(i) The distance of the observer from the transmitters.

(ii) The bearing of the observer from the base line joining the pair of stations which he is using.

(iii) The angle of intersection of the hyperbolic position lines.

It should be apparent from the inspection of any lattice chart that an inherent small equipment error, or a small personal error that may occur at the receiver will cause a geographical error of varying amount according to the observer's position.

It is important to realize that accurate equipment is no guard against the vagaries of the propagation of radio waves. The beacons and systems operating on medium and low frequencies are liable to "night error" in areas where the ground and sky waves are received with equal strength; these areas will occur at ranges depending upon the particular frequency used by any beacon or system. Where the transmissions of two stations are synchronised to provide one signal reading and position line, "night error" will be a minimum along the normal to the base line joining the pair of stations, and a maximum towards the limits of their service sector.

Little is yet known about the effects of hills and discontinuities in the terrain (such as cliffs) on the speed of medium-and low-frequency radio waves.

At the other end of the radio spectrum, the transmissions of systems operating on the very high frequencies are subject to distortion in abnormal atmospheric conditions.

Fixing by radar.—Radar may also be of considerable assistance when navigating in coastal waters in low visibility or at night. It is essential, however, to appreciate the limitations of a radar set when interpreting the information obtained from it. It must be remembered that the radar horizon is only slightly farther than the visual horizon would be, in good visibility, for a height of eye equal to the height of the radar aerial. Hence no echoes will be received from a coastline lying below the radar horizon, while echoes may be received from high ground farther inland which will give a misleading impression of the range of the nearest land.

Depending on the width of its beam, the bearings from a radar set tend to be inaccurate. It is therefore preferable, when fixing by radar, to use ranges rather than bearings. It is then most important to consider carefully the identity of the object giving the echo, using the bearing as an indication, and the height of the object to determine whether it will appear on the radar presentation. Radar Range Nomograms are useful in deciding this, but a satisfactory result can be obtained by using "Distance to Sea Horizon Tables".

When two or more objects on the radar presentation have been selected and positively identified, a satisfactory fix can be obtained by striking arcs on the chart with the radar range of the selected objects. These arcs intercept at the ship's position. Best results will be obtained by using isolated objects such as detached lighthouses, rocky islets, and the extremities of long piers or jetties, but where no such objects are available a steep coastline with cliffs should be used. Flat or gently shelving coastlines, such as mud flats or sand dunes, should not be used since it is difficult to identify any portion of them on the radar presentation. Identification is assisted in some areas by fitting objects, such as buoys and beacons, with radar reflectors, causing them to return strong echoes. Attention is drawn to the symbols with which such objects are marked on Canadian Charts, and which are given in the latest edition of Chart No. 1, "Symbols and Abbreviations used on Canadian Hydrographic Service Charts".

The difficulty of positive identification of objects is largely reduced if a Chart Comparison Unit is used in conjunction with the navigational radar. Fixes obtained with this equipment employ, in principle, an infinite number of ranges of the terrain in the vicinity of the ship, and in so doing a satisfactory fix will normally be assured.

In addition, radar beacons are available in some areas. Details of these and their use are given in the Admiralty List of Radio Signals, Volume II.

LIGHT, BUOYAGE AND SIGNAL SYSTEMS

LIGHTS.—All lights of Canada, under the control of the Department of Transport are maintained in operation whenever navigation in the vicinity is open. Lights used solely as harbour lights are not exhibited when the harbour is closed, although the general navigation may remain open. Fishing lights are maintained only during the fishing season. In any case where there is reasonable doubt whether the light is required it is kept in operation.

Lightvessels.—Riding lights.—There is no uniformity of practice in regard to Canadian lightvessels carrying riding lights.

BUOYAGE.—The following system of buoyage is adopted in the waters of Canada:—

Approaching from seaward, all buoys on the **starboard** side of the channel are painted *red,* and, if numbered, marked with even numbers, and must be left on the starboard hand.

Approaching from seaward, all buoys on the **port** side of the channel are painted *black,* and, if numbered, marked with odd numbers, and must be left on the port hand.

Numbers, when used, are in consecutive order commencing from seaward.

Buoys painted *red* and *black* in horizontal bands mark **middlegrounds,** and are left on either hand.

Buoys painted *white* and *black* in vertical stripes mark **mid-channel,** or the **fairway,** and may be passed on either hand. These buoys are rarely used.

Pillar, light, bell, and whistle-buoys mark special positions, a detailed description of which is given when the mark is first established.

Conical buoys, when used, are always on the starboard side of the channel and can buoys on the port side; conical topmarks on starboard hand buoys, and cylindrical topmarks on port hand buoys. All starboard hand spar buoys have pointed tops and all port hand spar buoys have flat tops; otherwise the shapes of buoys have no special significance at present.

The rule for colouring buoys is also applicable to beacons and other day-marks, so far as it may be practicable to carry it out.

The spar buoys in the rivers are swift current buoys, ballasted with iron rings to keep them upright.

Light-buoys and **Light-beacons.—Starboard hand** buoys show *flashing red* lights and **port hand** buoys show *flashing white* lights, that is, red buoys will carry *red* lights, and black buoys *white* lights.

The following are the regulations governing the use of bushes in marking channels in Canada:

Hardwood bushes shall be used on the **starboard** side of channels.

Evergreen bushes shall be used on the **port** side of channels.

Caution.—Buoys marking outlying dangers, owing to their exposed positions, are always liable to break adrift or to other accident; therefore implicit reliance should not be placed on their being in position.

Buoyage season.—Buoys in Canada are, generally speaking, maintained in position during the season of navigation. In localities where the lights are maintained in operation throughout the year, the buoys are always kept in position. In districts where navigation is closed in winter, the buoys are kept out in autumn, until the last vessel has cleared, or as late as the ice will allow, with due regard to their safety. The buoys are replaced in the spring, as soon as the ice will permit.

CAUTION.—Damaging aids to navigation.—Masters of vessels who injure, alter, or make fast to any aid to navigation, render themselves liable to a fine of $200. Any master of a vessel who, through unavoidable accident, has displaced any aid to navigation, must give notice of the same to the nearest Customs officer, or be liable to a fine of $50.

WRECKS.—Buoys, and the topsides of vessels used for marking wrecks, are painted *green* with a white inscription, and moored, when possible near the side of the wreck next to mid-channel.

Wreck-marking vessels exhibit:—

By day.—Three balls from a yard, 20 feet above the sea; two placed vertically on the side that shipping may safely pass and one on the other side.

By night.—Three *fixed white* lights, similarly arranged; the ordinary riding light is not shown.

Mariners must pass on that side of a wreck-marking vessel on which the two balls or two lights are shown.

SIGNAL SYSTEMS

Government stations for communication with shipping.—The Government of Canada has in operation a system of communication between the shore and vessels navigating the waters adjacent thereto.

RADIO AID TO NAVIGATION SERVICE.—For full details mariners are referred to the Special Notice to Mariners "Radio Aids to Marine Navigation" published early in the spring of each year; additions or alterations to the same will be contained in regular Notices to Mariners.

Coast Radio stations in the Gulf and River St. Lawrence, which are open for public correspondence, are established at Canso, Camperdown, Seven Islands, North Sydney, Cape Race, Grindstone Island, Belle Isle, Ellis Bay, Fame Point, Father Point, Quebec, Montreal, Cornwall and Kingston.

The following radio stations, located in the same area as above, transmit special information:

Weather reports.—Kingston, Montreal, Quebec, Father Point, North Sydney, Grindstone Island, Fame Point, Belle Isle, Cape Race, Canso and Camperdown.

Time signals.—Camperdown and Ottawa.

Radio direction-finding stations.—Belle Isle, Camperdown, Canso, Cape Race and St. Paul Island.

For details of United States stations, mariners should consult "Radio Aids to Navigation, Great Lakes", published by the United States Hydrographic Department. Corrections to this publication will be published in the weekly Notices to Mariners issued by the Branch Hydrographic Office, Detroit, Michigan.

Marine Signal Service Stations.—The Government of Canada has in operation a very complete system for the purpose of maintaining communication between ship and shore; these stations extend from Saint John, N.B., Cape Race, Newfoundland, and Belle Isle up the Gulf and River St. Lawrence, and through the Great Lakes to Port Arthur and Fort William, Ontario. This system includes a network of radio stations; a chain of signal stations connected with the commercial telegraph lines; and a string of telephone stations on the river, whereby the progress of a vessel may be continuously reported to Quebec and Montreal.

Any vessel showing its official number to any of the Marine Signal Service stations in the Gulf or River St. Lawrence is reported immediately, and all reports are promptly posted on the bulletin board at the Canadian National Telegraph Company's office, Quebec, and on that at the Board of Trade, Montreal. These reports are repeated to the pilot station at Father Point so that pilots may be aware of the locality of inward bound vessels.

Vessels bound to and from the minor ports of the River and Gulf of St. Lawrence are particularly requested to show their official numbers whenever possible.

Dispatches to and from vessels are duly delivered as addressed. They are charged for at the ordinary telegraph rates between stations, but no charge is made for signalling between coast stations and vessels at sea; dispatches may, by special request, be delivered in cipher, otherwise they are transmitted in ordinary language.

All stations report movements of vessels and daily weather conditions either to Montreal or Quebec, and daily bulletins covering the same are issued at Montreal and Quebec.

The Signal Service offices at Montreal and Quebec are open day and night for the purpose of providing the public with information regard shipping matters.

All stations report either by radiotelegraph, telephone, or telegraph.

Marine Signal Service code in use between Montreal and Quebec at all of the undermentioned stations:

Montreal reporting station
Longue Pointe " "
Cap St. Michel " "
Sorel " "
Trois Rivières " "
Batiscan " "
Grondines " "
St. Nicholas " "
Quebec " "

MARINE
SIGNAL SERVICE
RIVER ST. LAWRENCE SHIP CHANNEL

No. 1
A vessel is aground obstructing channel.
Signal:
By day—Ball and Drum.
By night—Two Lights, Red.

No. 2
A vessel is aground partially obstructing channel.
Signal:
By day—Drum and Ball.
By night—Two Lights, White.

No. 3
Dense fog or smoke or blinding snow-storm reported.
Signal:
By day—Cone.
By night—One Light, Red.

No 4
Foggy, smoky, or light snow reported.
Signal:
By day—Ball.
By night—One Light, White.

No. 5
Do you expect to go right through to Montreal or Quebec.
Signal:
By day—Ball and Cone.
By night—Two Lights, White and Red.

Signals displayed at west end of cross-spar indicate river or points above station.
Signals displayed at east end of cross-spar indicate river or points below station.
For communications between vessels and stations, or vice versa, the International Code of Signals to be used.

Fire warning signal by vessels in Canadian ports.—In the event of fire occurring at a wharf at which any vessel is moored, or on board any vessel whatever (except a vessel under way), such vessel shall give *five* blasts of from *four* to *six* seconds duration each, as an alarm to indicate such fire. This signal shall be repeated at intervals, and shall be used in addition to, but not in substitution for, other means of reporting a fire, and shall not be used for any other purpose.

Search and Rescue Services.—The Royal Canadian Air Force has been designated as the agency for co-ordinating all marine search and rescue services, for cases of marine distress on the East and West coasts of Canada, the approaches thereto, and on the Great Lakes. Such co-ordination is handled by Rescue Co-ordination Centres at Halifax, N.S., Vancouver, B.C., and Trenton, Ontario.

In cases of marine distress, where assistance is required, a message is to be sent directly to the Rescue Co-ordination Centre concerned and stating what assistance is required.

The addresses of the applicable centres are as follows: —

(1) Rescue Co-ordination Centre, RCAF Maritime Group Headquarters, Halifax, N.S.

(2) Rescue Co-ordination Centre, RCAF Training Command Headquarters, Trenton, Ontario.

REGULATIONS

For the River St. Lawrence from Father Point to the Victoria Bridge at Montreal

Order in Council Passed May 19, 1931

(1) Subject to Article 16 hereof, the following Regulations extend and apply to the ports of Montreal and Quebec, including the harbours of Montreal, Trois Rivières and Quebec, and including all the navigable waters of the River St. Lawrence lying between the Victoria Bridge at Montreal and Father Point.

(2) If any mark or aid to navigation placed within the limits hereinbefore mentioned to facilitate navigation or the business or purpose of Her Majesty or if any dredge of Her Majesty lying or in operation in the said waters, be removed, carried away or injured by any person or by any vessel or vehicle, such mark or aid to navigation or dredge shall be replaced, if possible, and any damage done shall be repaired or made good forthwith; if the removal or injury was caused by a vessel or vehicle, the owner, agent, consignee or master in charge of such vessel or vehicle shall replace, repair or make good the damage, and in any other case the person causing the removal or injury. Unless the mark, or aid to navigation, or dredge is replaced, if that be possible, within forty-eight hours the person liable to replace the same shall be deemed to have committed an offence against these regulations.

(3) It is prohibited to injure, alter or make fast to any aid to navigation, and in the event of a breach of this regulation by any vessel, the master of such vessel shall be liable to the penalty hereinafter provided. Furthermore, where through unavoidable accident any aid to navigation has been displaced, the master of the vessel displacing the same shall give notice to the nearest agent of the Department of Transport and failure to give such notice shall be deemed to be a breach of these regulations.

(4) A vessel shall be liable to Her Majesty for any damage done by it to any aid to navigation, Ship Channel equipment, or any other property of Her Majesty.

(5) No person shall encumber navigable waters or in any way obstruct the navigation thereof with stones, filth, rubbish, timber, logs, spars, rafts or cribs, wrecks of steamers or other vessels; or throw therein, fuel-oil, coal, ashes, cinders, hay, straw, ballast, or any other matter or thing by which the navigation may be impeded or injured; and a further like penalty to that which is hereafter imposed for a breach of this Regulation shall be incurred by any person guilty of such breach, if he does not remove or cause to be removed any such encumbrance or obstruction, within a reasonable time to the satisfaction of the Minister of Transport after being required to do so by any officer appointed for such purpose by the Minister, and a further like penalty shall be incurred for every subsequent day during which said encumbrance or obstructions are not removed.

(6) No vessel while under way or drifting, shall trail her anchor.

(7) No vessel drawing 9 feet of water or less, or no barge or raft whatsoever, shall—except in case of accident, or stress of weather, or force of current—use the deep water channels in the following portions of the River St. Lawrence:—

(*a*) Near Pointe aux Trembles (en haut).

(*b*) At, between, or near Varennes, and Buoy 5-M., St. Ours Traverse, except between Buoys 104-M and 116-M., and also between Buoys 122-M. and 124-M.

(*c*) In Lake St. Peter between the upper end of St. Francis Bank and Banc des Anglais.

(*d*) At or near Port St. François.

(*e*) At, between and near Batiscan and Cap Charles.

(8) All rafts descending the river, whether in tow of a steamer or otherwise, shall:—

(*a*) Keep to the Northward of Ile Deslauriers or Laurette Island, and Ile Bellegarde, and—

(*b*) When opposite to Ile aux Raisins, Lake St. Peter, keep to the south of the Ship Channel, as far as Nicolet Traverse.

(9) Vessels when passing dredges, wrecks, and tows of barges must not do so at greater than slow speed.

(10) Every vessel overtaking another and intending to pass shall, at a distance of one-half mile from the other vessel, give one prolonged blast on her steam whistle, to which the other shall, if safe and practicable, reply by a similar signal, decrease her speed, to dead slow if necessary, and direct her course to port; and the overtaking vessel, upon arriving in close proximity to the overtaken vessel, shall also reduce her speed, maintaining only sufficient speed to enable her to pass the overtaken vessel to starboard. After having answered the prolonged blast of the overtaking vessel by a similar signal, if the overtaken vessel does not consider it safe and practicable to allow the other vessel to pass to starboard, she shall, after an interval of not less than one minute and not more than two minutes, give one short blast and direct her course to starboard, whereupon the overtaking vessel shall direct her course to port and pass accordingly.

(11) All vessels navigating against the current, or tide on each occasion, before meeting another vessel at sharp turns, narrow passages, or where the navigation is intricate, shall stop, then, if necessary, come to a position of safety below or above the point of danger, and there remain until the channel is clear.

(12) Vessels may not be towed unless the following conditions are complied with:—

(*a*) If canal barges, there shall not be more than 10 in number, 5 in length and 2 abreast.

(*b*) If sand barges, there shall not be more than 6 in number, 3 in length and 2 abreast.

(*c*) If mixed vessels, there shall not be more than 8 in number, 4 in length and 2 abreast.

(*d*) A complete tow from stem of the tug to the stern of tow shall not exceed 1,000 feet in length.

(13) A steam vessel when at anchor, shall between sunrise and sunset, carry in the forward part of the vessel a black ball not less than two feet in diameter, and at or near the stern of the vessel, another such ball. The forward ball shall be carried at a height so as to be clear of the superstructure or other erections other than the funnel on the vessel, but in no case less than 20 feet above the hull, and the stern or after ball shall not be less than 15 feet lower than the forward ball. The above signals to be reversed in the event of a vessel anchored only by the stern.

Every vessel anchoring with the stern anchor, shall notify the Signal Service at Quebec by wireless accordingly, who in turn shall notify all vessels.

(14) Every person who commits a breach of these regulations shall be liable on summary conviction to a penalty not exceeding Forty Dollars and the costs of the conviction, and in default of payment of such penalty and costs shall be liable to imprisonment for a period of not more than thirty days.

(15) Articles 7, 8, 10, and 11 of these Regulations shall apply only to that section of the St. Lawrence River, lying between the Victoria bridge at Montreal and the western limits of the harbour of Quebec.

Amendment to International Rules of the Road in force for the St. Lawrence River from Lock No. 1, Lachine Canal, Montreal, to Father Point.

The following rules with respect to day and night signals, to be displayed by dredging plants, shall apply in the St. Lawrence River between Lock No. 1, Lachine Canal, Montreal, and Father Point Wharf, P.Q.:—

Daytime means from sunrise to sunset, and night-time means from sunset to sunrise.

Elevator or Bucket Ladder Dredges, and Hydraulic Dredges, during daytime will show, at the forward and after end of the vessel on the side on which the traffic is to pass, two black balls or shapes not less than 2 feet in diameter, suspended one over the other not less than 6 feet apart and at least 10 feet outside the hull. During the night-time, red lights similarly placed will be shown.

Dipper Dredges, during daytime will show, at the forward and after end of the dredge, on the side on which the traffic is to pass, two black balls or shapes, not less than 2 feet in diameter, suspended one over the other, not less than 6 feet apart and at a sufficient distance from the side of the dredge and sufficiently high, to make sure that under no circumstances, with the dipper arm and boom athwartship, can the visibility of these shapes be interfered with. During night-time red lights similarly placed will be shown.

At night-time, pipelines attached to **Hydraulic Dredges,** either floating or supported by trestles, shall display one row of white lights clear of all obstructions, one light for each section of pipe. The discharge end of the pipeline shall show a red light. All lights to be visible around the horizon.

At night-time, the usual lights required by the International Collision Regulations for a vessel at anchor shall also be shown.

Attention is drawn to Paragraph (11) of the Regulations for the St. Lawrence River from Father Point to the Victoria Bridge at Montreal, which is as follows:—

(11) All vessels navigating against the current, or tide on each occasion before meeting another vessel at sharp turns, narrow passages, or where the navigation is intricate, shall stop, then if necessary, come to a position of safety below or above the point of danger, and there remain until the channel is clear.

THE ST. LAWRENCE RIVER SHIP CHANNEL

The minimum depth of water in the ship channel between Quebec and Montreal is not less than 35 feet (10^m7) at low water and it is maintained at this depth throughout the year. The low stage of the river is ordinarily reached about September 15, and it continues till after the close of navigation at the end of November.

The Repentigny Steamboat Channel, from Lanoraie to Île Ste. Thérèse, has a depth of 15 feet (4m6) at extreme low water. Vessels drawing this depth or less should use this channel.

The dredged portions of the ship channel have a minimum width of 550 feet (167m6), but the bends and difficult places have, in most cases, been enlarged to 800 feet (243m8) or more.

The Pilotage offices at Montreal and Quebec are open day and night, and here all Notices to Mariners, Lists of Lights, and other publications of the Department of Transport may be seen. The daily depths of water in the ship channel, as indicated by the National Harbours Board gauge at Montreal and the Government gauges at Sorel and Trois Rivières, are posted in the Pilotage offices.

Weather and ice conditions.—Fogs may occur occasionally on the St. Lawrence River, in the early part of the day, throughout the season of navigation, but the thickest weather, and the most continuous, is usually experienced in September and first half of October, by reason of the smoke from the bush fires which usually occur during this dry season.

Throughout a period of thirty years, the average number of days in the year on which fog occurred on the river between Quebec and Montreal, was eighteen. The average yearly rainfall was about 42 inches, (1m0) the greatest fall usually occurring during the month of July.

The mean temperature of the year, throughout the same period, was 40·5 degrees Fahrenheit, ranging from an absolute temperature of 95 degrees in July to 30 degrees below zero in January.

The prevailing winds are west and southwest, though in the lower part of the river strong northeasterly winds are prevalent from March to June.

The river seldom, if ever, freezes across below Quebec, but it is almost filled with ice that fluctuates with wind and tidal stream from shore to shore.

Above Quebec, ice bridges form and jams occur, with stretches of open water between, in which the floating ice, carried down stream by the current from the upper reaches of the river, accumulates, forcing the water to rise and back up and in earlier years causing destructive floods.

For a number of years ice-breaking steamers have been employed by the Department of Transport for short periods during the winter months, in keeping the channel open between Quebec and Trois Rivières. This reduces the possibility of flooding, as well as tending toward an earlier opening of the ship channel to Montreal.

The length of the *period of navigation* is best shown by the following figures:—

Throughout a period of 65 years, 1887 to 1951, inclusive, the average date on which the ship channel between Quebec and Montreal was open was April 17; the earliest date throughout that period was March 19, in 1931, and the latest May 1, which was the date on five occasions, the most recent being in 1926.

The average date on which the first vessel from sea arrived at Montreal, was April 24, the earliest date throughout the same period was April 7, in 1949, and the latest May 24, 1943.

During the same period, the average date of the last departure for sea from Montreal was December 4; the earliest was November 21 in 1891, and the latest December 19 in 1946. (*See also page 71*).

Tides.—A knowledge of the tides is at all times of great importance to mariners, and in a river estuary, such as the St. Lawrence, the subject is most complex. Since 1894 a systematic study of the actions and special features of

the tides has been carried on by the Canadian Government, so that to-day, by making intelligent use of the various tables and special information relating to the tidal portion of the river, and the facilities, already described, for ascertaining the depths at any time in the non-tidal portions, full advantage may be taken of the maximum available depths in the ship channel, in piloting a deep-draught vessel all the way to Montreal.

The following notes and tables are taken from the "Tide Tables for the Atlantic Coast of Canada", issued annually by the Hydrographic Service, Department of Mines and Technical Surveys, Ottawa, to which mariners are referred for more complete details.

The daily tide tables for Quebec and the tidal differences for other places on the river are based on tidal observations obtained by means of self-registering tide gauges, which are kept in continuous operation day and night, throughout the year.

SPECIAL FEATURES OF THE TIDE ABOVE QUEBEC

The following are the most noteworthy features of the tide, carefully and concisely stated, with special reference to the lower stages of the river and the tidal low waters, as these are of most importance in regard to the depth available for navigation.

(1) At Point Platon and above, the effect of neap tides is to cause the low water level to fall lower than at spring tides. At ordinary stages of the river, the lowest low waters of the month thus occur shortly after the moon's quarters, but at the high stage the neap effect is delayed so that the lowest low waters may be long after the moon's quarters, and they may be even as late as the date of the next new or full moon. At Quebec, the average difference of level between low water neap tides and low water spring tides is $2\frac{3}{4}$ feet; the neaps being the higher as is usual in open tidal waters.

(2) Next in importance to the springs and neaps is the variation in height caused by the change in the moon's distance. It is accordingly possible for low water at one of the neap tides of the month to be a *foot and a half* lower than the other. There is also a distinct diurnal inequality at times when the moon's declination is high. This may amount to a difference of more than *one foot* in the height of the two low waters of the same day. The inequality of the height in successive high waters is much greater. Such variations should not be attributed to wind disturbance, as the cause is strictly astronomical.

(3) Throughout the river, at Quebec and above, the range of the tide is reduced by the high stage of the river. The range thus becomes greater during the season, as the river falls, and accordingly the decrease in the available depth at *high water* is not quite so great as the fall in the stage of the river would indicate.

(4) The tidal differences in time also vary with the season. When the river is at its high stage in the spring, the time which high water takes to progress up the river from Quebec to Cap à la Roche is less than the average; and the time which low water takes is 10 to 12 minutes greater than during the low stage of the river in summer.

The Stage of the River.—The mean level of the water in the river falls gradually from the high stage in the spring to the low stage in the autumn; the usual change in level, May to September, from this cause averages five feet at Trois Rivières and it grades downward to an average of $1\frac{3}{4}$ feet at Neuville; below St. Augustin Bar the seasonal change in mean level is inappreciable.

From records covering five to ten seasons in the years 1930-1939, the average highest level and lowest level, the result mainly of tide and river stage, are given for each month, May to November, in the table following. The variation, year to year, is considerable but these values represent extremes that reasonably may be expected throughout any one season. 5

QUEBEC TO LAKE ST. PETER: average of *highest* and *lowest* levels, at high and low tide respectively, for each month. Heights are above chart datum.

Place	May		June		July		Aug.		Sept.		Oct.		Nov.	
	H'st.	L'st.	H'st.	L'st.	H'st.	L'st.	H'st.	L'st.	H'st.	L'st.	H'st.	L'st.	H'st.	L'st.
	Feet		Feet		Feet		Feet		Feet		Feet		Feet	
Quebec (Levis)	19·8	0·6	19·1	0·5	18·8	0·2	18·6	0·1	18·5	−0·1	19·0	−0·7	19·3	−0·6
Neuville	18·5	1·9	17·2	1·4	16·4	0·8	16·1	0·6	15·9	0·1	16·6	−0·3	16·6	−0·1
Pointe Platon	19·3	3·4	17·8	2·5	16·8	1·8	16·0	1·1	16·0	0·8	16·5	0·6	17·4	1·5
Lotbiniere	16·8	4·4	15·2	3·5	14·4	2·4	13·2	1·3	13·3	1·2	13·8	1·1	14·8	1·6
Grondines	15·2	4·1	13·0	2·3	11·9	1·4	11·5	0·7	11·3	0·1	12·0	0·2	12·3	0·8
Cap à la Roche	13·3	4·0	11·4	2·4	10·2	1·4	9·7	0·8	9·6	0·3	10·1	0·4	9·9	0·9
Batiscan	10·3	4·3	8·2	2·6	7·0	1·6	6·4	1·0	6·2	0·4	6·8	0·6	6·8	1·1
Trois Rivières	9·1	4·4	6·1	2·6	4·5	1·5	3·8	0·8	3·5	0·2	4·0	0·3	4·1	0·5
Lake St. Peter	8·1	4·1	5·0	2·2	3·3	1·2	2·6	0·6	2·3	0·1	2·6	0·0	2·7	0·1

The following tables show the rate of progress of the tide above Quebec, and how the height of the tide at Quebec may be determined approximately for any hour.

WITH QUEBEC TIDE TABLES

TIDAL DIFFERENCES for the St. Lawrence
All results obtained are in Eastern Standard Time

Locality	Differences For H.W.	Differences For L.W.	Range Springs	Range Neaps
	H. M.	H. M.	Feet	Feet
Trois Rivières	add 4 45	add 6 15	1	¼
Champlain	" 4 08	" 5 30	2¾	1
Batiscan	" 3 32	" 4 49	3½	1¼
Cap à la Roche	" 2 37	" 3 48	7	3¾
Grondines	" 2 14	" 3 18	8½	5
Lotbinière wharf	" 2 09	" 2 56	9¾	5½
Barre à Boulard	" 2 04	" 2 41	9¼	5½
Pointe Platon	" 1 43	" 2 11	13½	9¼
Ste. Croix	" 1 31	" 2 00	14	9½
			†RISE	RISE
Neuville	" 1 12	" 1 15	16	10½
St. Augustin Shoal	" 0 54	" 0 53	16½	11
St. Nicholas	" 0 35	" 0 32	17½	12
Sillery	" 0 10	" 0 06	18	12½
QUEBEC	" 0 00	" 0 00	18¼	13¼

*TIDE AT QUEBEC

Hourly height of tide, above the Low water datum of the charts, and the Tide Tables

For Average Spring Tides		For Average Neap Tides	
Hour	Feet	Hour	Feet
At Low Water	0·0	At Low Water	2·7
1 h. after L.W.	5·1	1 h. after L.W.	4·6
2 h. " "	10·0	2 h. " "	7·9
3 h. " "	13·9	3 h. " "	10·6
4 h. " "	16·9	4 h. " "	12·3
4¾ h. (At H.W.)	18·0	5 h. " "	13·1
1 h. after H.W.	15·3	5¼ h. (At H.W.)	13·2
2 h. " "	11·2	1 h. after H.W.	12·0
3 h. " "	9·1	2 h. " "	10·4
4 h. " "	7·0	3 h. " "	8·9
5 h. " "	4·7	4 h. " "	7·2
6 h. " "	2·7	5 h. " "	5·4
7 h. " "	0·9	6 h. " "	3·9
7¾ h. (At L.W.)	0·0	7¼ h. (At L.W.)	2·7

* Only an approximation of the height of tide at any hour can be obtained from the table above because there are large variations in the tide at both springs and neaps. Effect of change in the Moon's distance.—When isolated, this is found to be as much as three feet at times; when perigee occurs at new or full moon the height at one of the spring tides of the month may be that much higher than at the other springs of the same month, because of the change in the moon's distance. Effect of Moon's Declination.—Similarly, the extremes in declination are found to affect the height of tide even to a greater degree at times; when the moon is in high declination, north or south of the equator, the two tides of the day, for a few days, are quite unequal in rise. One high water may be as much as four feet higher than the other of the same day. These effects in varying degrees are always combined with those of the moon's phases.

† Higher high waters.

GENERAL PHYSICAL FEATURES OF THE ST. LAWRENCE RIVER AND GREAT LAKES SYSTEM

The St. Lawrence River system, comprising an estuary and a series of connected lakes, affords a course of water communication from the sea to the middle of the North American continent. From the head of Lake Superior, about longitude 92¼° W. to its mouth near longitude 64½° W. this magnificent waterway has a total length of about 1,635 nautical miles.

The St. Lawrence River, which constitutes the main outlet channel of the system, has its source in Lake Ontario at an elevation of 243 feet (74^{m}1) above sea-level, and in its course to the sea assumes several lake-like expansions, such as Lakes St. Francis, St. Louis, and St. Peter. At other places it forms rapids, which are circumnavigated by canals accommodating vessels of 14-foot (4^{m}3) draught and 255 feet (77^{m}7) length. The distance by this waterway from the Strait of Belle Isle to Port Arthur or Fort William on the northwest coast of Lake Superior is 1,933 nautical miles (2,226 statute miles); the distance to Duluth is 2,039 nautical miles (2,348 statute miles); the distance to Chicago is 1,959 nautical miles (2,255 statute miles); from the Strait of Belle Isle to Montreal the distance is 878 nautical miles (1,011 statute miles); and from Quebec to Montreal the distance is 138¼ nautical miles (160 statute miles).

From Montreal to Quebec, the river has an average width of two and a third miles, a maximum width of seven and a quarter miles in Lake St. Peter and a minimum width of a quarter of a mile a short distance above Quebec. Lake St. Peter is shallow, but by dredging this and other shoals, a 35-foot (10^{m}7) channel has been obtained from Montreal to the sea. The river between Montreal and Quebec is crossed by two bridges with clearances for the largest vessels.

The **estuary** begins to broaden out at Quebec and increases from a width of 8 miles at the foot of Orleans Island to 24 miles at Pointe des Monts and to about 70 miles at the western end of Anticosti Island. According to Royal Proclamation of 1763 and by decision of the Canadian Geographic Board, the line constituting the transition of the estuary into the Gulf of St. Lawrence extends from Cap des Rosiers, at the eastern end of the Gaspé Peninsula, to the mouth of the St. John River on the north shore about abreast of the western end of Anticosti Island.

Many islands are formed in the St. Lawrence River, the most important being Orleans just below Quebec City, and the Island of Montreal at the mouth of the Ottawa River.

From Montreal to Quebec, the shores of the river are comparatively low, but at the City of Quebec the mountains begin to close in on both sides of the river valley and the lower portion of the river is bounded on both sides by mountain ranges. At Cape Tourmente, 25 miles below Quebec, the Laurentian Highlands come out on the river as a mountain 1,874 feet (571^{m}2) high. They follow on along the shore past the mouth of the Saguenay River rising to 2,551 feet (777^{m}5) at Les Eboulements and over 1000 feet (304^{m}8) on the Saguenay. They retreat on the lower river and continue at varying distances in rear of the coast to the Strait of Belle Isle.

The south coast of the river is comparatively low, but below Quebec the Appalachians can be seen as a mountain background which comes out on the river at Matane. The mountains, now known as the "Shickshocks", continue thence along the south shore and form the rough tableland of Gaspé. In their course they occasionally rise to 3,700 and 4,000 feet (1,127^{m}8 and 1,219^{m}2) but their average height on the Peninsula of Gaspé is 3,000 feet (914^{m}4).

Navigation on the river is closed in winter, although the river is not frozen below Quebec. In the spring, the Government icebreakers are very useful in preventing ice-blockades. As a result the river is open rather earlier than would otherwise be the case.

Such are the broad, general features of the St. Lawrence River. A detailed description of the river and directions for its ascent from the Gulf to Quebec City are given in the *St. Lawrence River Pilot.*

Tributaries.—There are many tributaries of the St. Lawrence River—the Saguenay, Montmorency, St. Maurice, and Ottawa are the most northern affluents, and the Chaudière, St. Francis, and Richelieu are important streams flowing in from the south. Lake Champlain, which discharges into the latter navigable stream, has river and canal connection with tidewater at New York for shallow draught craft.

Improvements.—The control of the St. Lawrence Ship Channel, its regulations and improvements, from the Gulf of St. Lawrence to Montreal Harbour is under the Department of Transport, whose annual reports give full information as to the history, development and operation of that channel.

From Montreal Harbour westward to the head of Lake Superior the improvements of the Canadian channels are under the jurisdiction of the Department of Public Works.

By means of channel improvements, Montreal Harbour has been placed at the head of ocean navigation and from this point begin the canal systems of the St. Lawrence River, by means of which the several rapids obstructing the river channel proper are overcome, and give access through the St. Lawrence Canals, the Welland Ship Canal, the Great Lakes and the Sault Ste. Marie Canal to the head of Lake Superior.

The difference in level between the point on the St. Lawrence River near the harbour of Trois Rivières where tidal influence ceases, and Lake Superior, is about 600 feet.

ST. LAWRENCE RIVER ABOVE MONTREAL

Montreal Harbour to Lake Ontario.—The portion of the river above Montreal, somewhat generally known as the upper St. Lawrence, and extending from the foot of Lachine Canal in Montreal Harbour to Kingston Harbour on the Canadian shore, and Tibbetts Point on the United States shore, at the foot or east end of Lake Ontario, has a total length of 158 nautical miles. Of this length there are 117 miles of natural river and open lake expansions and 41 miles of canalized water. The average width of the river is $1\frac{1}{3}$ miles. The lake expansions are Lakes St. Louis and St. Francis. The former, reached from Montreal by the Lachine Canal, is 12 miles long, and has a greatest width of $5\frac{1}{4}$ miles. Lake St. Francis is 27 miles long and with a maximum width of 4 miles.

This portion of the river is in part an international waterway, the Canadian-United States boundary line falling approximately in the middle of the stream from the head of Lake St. Francis, near Cornwall, to Lake Ontario. The portion from Montreal to Cornwall, 61 nautical miles in length, is entirely within Canadian territory and all the canals throughout its entire length are owned and operated by the Canadian Government, but the use of these are free to the vessels of foreign countries.

Between the Prescott terminals, 118 statute miles above Montreal, and Kingston, at the foot of Lake Ontario, the main navigation channel is partly on the Canadian side of the International Boundary and partly on the United States side. Improvements in this section of the river have now made available a depth of 25 feet.

Canals.—General Description.—The Canadian Government canals on the through route between Montreal and Lake Superior are the Lachine, Soulanges, Cornwall, Farran Point, Rapide Plat, Galop, Welland Ship and Sault Ste. Marie. Their total length is 75·92 statute miles; total lockage or difference of elevation directly overcome by locks, 554 feet. The number of locks which a vessel would encounter during its passage from Montreal, at the head of ocean navigation, to the head of Lake Superior, is 30.

The canals on the St. Lawrence River, the Lachine, Soulanges, Cornwall, Farran Point, Rapide Plat and Galop, the latter three being collectively known as the Williamsburg Canals, as at present constructed, control the size of vessel that can traverse the through route, and the limiting lock in this respect is Lock No. 17, situated at Cornwall on the Cornwall Canal. This lock has the following dimensions: length between hollow quoins of gates, 270 feet; width of bottom, 43 feet 8 inches; width at coping, 45 feet 3 inches; depth of water over mitre sills, 14 feet, which will accommodate vessels having the ordinary perpendicular and pointed bow and rounded stern up to an overall length of 255 feet.

Permissible or Limiting Draught.—The draught of vessels permitted to enter and pass through these canals is dependent upon the water surface elevations of Montreal Harbour and the river above, which vary from time to time.

Note.—The permissible draught is published from time to time in "Notices to Mariners". For 1955, the permissible draft was 14 feet 3 inches for vessels without bilge keels or stabilizing fins and 14 feet 0 inches for vessels fitted with either of these additions.

The upper entrance of the Galop Canal, the last of the St. Lawrence canals, is 113 statute miles above Montreal, and 5 miles above this point the Lower Lakes Terminals, which are referred to as the Prescott Terminals, are situated. These terminals, completed in 1930, are under the control of the Department of Transport and consist mainly of a reinforced concrete elevator of 5,500,000 bushels capacity, equipped with the necessary facilities for the unloading and storing of grain received from upper lake freighting steamers; of the forwarding of such grain, either by St. Lawrence River canalized vessels, or by rail as required. The wharves at the terminal will accommodate vessels drawing up to 24 feet. (*See page 124*).

Farran Point, Rapide Plat Canals and the terminal sections of the Galop Canal are electrically operated. Following is a detailed description of the St. Lawrence canals:

LACHINE CANAL

Length of canal	8·74 miles
Number of locks—	
Lift	4
Guard	1
Dimensions of locks	270 feet by 45 feet
Total rise or lockage	46·24 feet
Depth of water on sills:—	
East Lock 1	
Normal	17 feet 6 inches
Extreme low water	13 feet 1 inch
East Lock 2	18 feet
North Locks 3 and 4	14 feet
South Lock 5 (normally)	14 feet
Minimum width of canal at water surface	150 feet
Minimum width of canal at bottom	140 feet
Minimum overhead clearance	94·8 feet (Lift Bridge)

The canal consists of one channel with two distinct systems of locks, the old and the new or enlarged. Old Locks Nos. 1, 2, and 5 are situated on the north side, old Locks Nos. 3 and 4 are on the south side.

The old locks are still available for navigation. Nos. 1 and 2 are 270 feet by 45 feet and under ordinary water conditions both have 15 feet 6 inches of water on mitre sills. At extreme low water in Montreal Harbour, however, old Lock No. 1 has only 11 feet 3 inches. Old Locks 3, 4 and 5 are 200 feet by 45 feet with only 9 feet of water on sills.

The canal extends from the Harbour of Montreal to Lake St. Louis at the City of Lachine, overcoming the Lachine Rapids, the first obstruction to bar the ascent of the St. Lawrence River.

All locks (except old Lock 5) and all bridges along the canal are electrically operated. The canal is electrically lighted.

Upbound and downbound vessels, approaching Lock 5, shall be governed by the signal lights located at each end of the lock on the south side. A *red* signal or no signal indicates that the structure is not ready, a *green* light that it is ready for the passage of the vessel; a *flashing red* light indicates that the lock is made ready for entry.

From the head of the Lachine Canal to the foot of the Soulanges the distance is 16 miles, and to the foot of the Ste. Anne Lock 13½ miles, with a normal controlling navigation depth in the latter case of 9 feet.

Note.—Canal distances as given, unless otherwise stated, are in statute miles.

Lachine Canal—Mileage and General Data

Mileage	Structure, Locality, etc.	Locks			
		Length Between Hollow Quoins	Minimum Width	Normal Draught	Lift
	Montreal Harbour—Standard low level, 18·99 above M.S.L.	ft. in.	ft. in.	ft. in.	ft.
0·00	Montreal Harbour—Mouth of Entrance Channel—				
0·04	East Lock 1	270 0	45 0	17 0	12·96
0·04	West Lock 1	270 0	45 0	15 0	.....
0·10	Basin No. 1				
0·21	East Lock 2	270 0	45 0	17 0	13·50
0·21	West Lock 2	270 0	45 0	15 0	.....
0·28	Bridge 1—Prince Street—Black's Bridge—Swing				
0·47	Basin No. 2				
0·61	Bridge—Can. Nat. Rys.—Lift				
0·65	Bridge—Can. Nat. Rys.—Swing				
0·67	Tunnel—Wellington Street				
0·76	Tunnel for water pipes—M.W.W.				
1·16	North Lock 3—"St. Gabriel"	270 0	45 0	14 0	9·02
1·16	South Lock 3 "	200 0	45 0	9 0	.....
1·23	Bridge 3—Seigneurs Street—Swing				
1·70	Bridge 4—Charlevois Street—Swing				
1·85	Bridge 5—Atwater Avenue—Swing				
2·07	Bridge—Can. Nat. Rys.—Swing				
2·45	Siphon culvert—St. Pierre River				
2·99	North Lock 4—"Cote St. Paul"	270 0	45 0	14 0	9·26
2·99	South Lock 3 " "	200 0	45 9	9 0	.....
3·27	Bridge 6—Cote St. Paul Road—Swing				
3·45	Siphon culvert				
3·27	Bridge 7—Rockfield—Highway bascule				
6·85	Bridge—Can. Pacific Ry.—Rockfield—Swing				
7·50	Lock 5—Lachine	270 0	45 0	14 0	1·50
7·56	Bridge 8—Lower Lachine Road—Swing				
8·74	Lake St. Louis—Mouth of entrance channel.				
	Total lift	.....	.....	.....	46·24

The draught at Lock 1 varies with the level of Montreal Harbour and at Lock 5 with the level of Lake St. Louis. During navigation seasons the depth of water on the sills of these locks has been as low as 13·08 feet at Lock 1 (November 17, 1934) and 12·25 feet at Lock 5 (November 11, 1934). The highest water level recorded at Lock 1 has been 45·25 feet (April 18, 1886) and at Lock 5, 22·20 feet (May 13, 1943).

SOULANGES CANAL

Length of canal	14·67	statute miles
Number of locks	5	
Guard gates	1	
Dimensions of locks	280	feet by 46 feet
Total rise of lockage	83·50	feet
Normal draught	14	feet
Breadth of canal at bottom	96	feet
Breadth of canal at water surface	160	feet
Minimum overhead clearance	135	feet (Transmission Lines)

The canal extends from Cascades Point to Coteau Landing, overcoming the Cascades Rapids, Cedar Rapids, and Coteau Rapids.

The locks on this canal are electrically operated and the canal lighted by electricity.

From the head of the Soulanges Canal to the foot of the Cornwall Canal there is a stretch through Lake St. Francis of 31 miles, which is navigable for vessels drawing 14 feet.

Soulanges Canal—Mileage and General Data

Mileage	Structure, Locality, etc.	Locks			
		Length Between Hollow Quoins	Minimum Width	Normal Draught	Lift
		ft. in.	ft. in.	ft. in.	ft.
0·00	Lake St. Louis—Mouth of Entrance Channel				
0·25	Lock 1—Cascades Point	280 0	46 0	15 0	23·50
0·52	Lock 2—Cascades Point	280 0	46 9	15 0	23·50
0·89	Lock 3—Cascades Point	280 0	46 0	15 0	23·50
0·95	Bridge 1—Quinze Chiens Road—Swing				
1·92	Culvert—Bissonnette Gully				
2·86	Bridge 2—St. Antoine Road—Swing				
3·38	Lock 4	280 0	46 0	15 0	12·00
3·57	Guard gates				
3·97	Head-race to power-house of M.L.H. & P. Cons.				
5·60	Culvert—Valade Gulley				
5·70	Bridge 3—St. Féréol Road—Swing				
8·00	Bridge 4—St. Dominique Road—Swing				
8·93	Culvert—Rivière à la Graisse				
9·04	Power-house				
9·94	Bridge 5—St. Emmanuel Road—Swing				
11·25	Culvert—Rivière Rouge				
11·51	Bridge 6—Rivière Rouge Road—Swing				
11·96	Siphon Culvert—Rivière Delisle				
14·01	Bridge—Can. Nat. Rys.—Swing				
14·03	Guard Lock 5	280 0	46 0	15 0	1·00
14·10	Bridge 7—Coteau Landing Highway—Swing				
14·67	Lake St. Francis—Mouth of Entrance channel				
	Total lift				83·50

The draught at Lock 1 varies with the level of Lake St. Louis and at Lock 5 with the level of Lake St. Francis. During navigation seasons the depth of water on the sills of these locks has been as low as 14·00 feet at Lock 1 (November 17, 1934) and 14·80 feet at Lock 5 (November 10, 1934). The highest level recorded at Lock 1 has been 33·50 feet (Fegruary 9, 1918) and at Lock 5, 19·00 feet (April 13, 1908).

CORNWALL CANAL

1834—1842—First canal built to provide 9 feet draught.

1876—1904—Canal enlarged to 14 feet draught.

Length of canal	11·00	statute miles
Number of locks	6	
Guard gates	1	
Dimensions of locks	270	feet by 45 feet*
Total rise of lockage	48	feet
Normal draught	14	feet
Breadth of canal at bottom	90	feet
Breadth of canal at water surface	154	feet
Minimum overhead clearance	150	feet (Transmission line)

The Cornwall Canal extends past the Long Sault Rapids from the City of Cornwall to Dickinson Landing.

The locks on this canal are electrically operated and the canal is lighted by electricity.

From the head of the Cornwall Canal to the foot of the Farran Point Canal the distance on the St. Lawrence River is $4\frac{3}{4}$ miles.

Cornwall Canal—Mileage and General Data

Mileage	Structure, Locality, etc.	Locks			
		Length Between Hollow Quoins	Minimum Width	Normal Draught	Lift
		ft. in.	ft. in.	ft. in.	ft.
0·00	East entrance—Cornwall				
0·01	Lock 15—Cornwall	270 0	45 0	14 0	12·7
0·25	By-pass				
0·32	Lock 17	270 0	43 8	14 0	13·3
0·43	Culvert				
0·82	Bridge 1—Highway—Swing				
1·55	Culvert				
1·65	Lock 18	270 0	45 0	14 0	8·0
1·84	Bridge 2—N.Y.C. R.R. and highway—Swing				
3·16	Lock 19	270 0	45 0	14 0	6·0
4·06	Culvert				
4·76	Lock 20	270 0	45 0	14 0	8·0
5·04	Guard gate				
5·99	Bridge 3—Highway—Swing				
10·38	Guard Lock 21	270 0	45 0	14 0	0·0
11·00	West entrance—Dickinson Landing				
	Total lift				48·0

When the St. Lawrence is low, draughts available at locks opening on the river are curtailed. During navigation season the depth of water on Lock 15 mitre sill has been as low as 12·8 feet and on Lock 21 as low as 12·3 feet, both in November, 1934.

* Lock 17 is only 43 feet 8 inches wide at the bottom and 45 feet 3 inches wide at the coping.

WILLIAMSBURG CANALS

The Farran Point, Rapide Plat and Galop Canals are collectively known as the Williamsburg Canals.

FARRAN POINT CANAL

Length of canal	1·28 statute miles
Number of locks	1
Dimensions of locks	800 feet by 50 feet
Total rise of lockage	4 feet 2½ inches
Normal draught	16 feet
Breadth of canal at bottom	80 feet
Breadth of canal at water surface	154 feet
Minimum overhead clearance	No restrictions

This canal enables vessels ascending the river to avoid Farran Point Rapids, passing a full tow at one lockage. Descending vessels run the rapids with ease and safety.

The canal is lighted by electricity.

From the head of Farran Point Canal to the foot of Rapide Plat Canal there is a navigable stretch of 9½ miles in the St. Lawrence River.

RAPIDE PLAT CANAL

Length of canal	3·89 statute miles
Number of locks	2
Dimensions of locks—	
Lock 23	285 feet by 45 feet
Guard Lock 24	270 feet by 45 feet
Total rise of lockage	11 feet 7¼ inches
Normal draught	14 feet
Breadth of canal at bottom	80 feet
Breadth of canal at water surface	154 feet
Minimum overhead clearance	No restrictions

The canal was constructed to enable vessels ascending the river to pass the Rapide Plat. Descending vessels run the rapids safely, except at extreme low stage of water in the river, when downbound vessels of full canal draught must also use the canal.

The canal is lighted by electricity and Lock 23 is electrically operated.

From the head of the Rapide Plat Canal to Iroquois, at the foot of the Galop Canal, the River St. Lawrence is navigable for 4 miles.

GALOP CANAL

Length of canal	7·36 statute miles
Number of locks	3
Dimensions of locks—	
Lift lock at foot of canal—No. 25	800 feet by 50 feet
Guard lock at head of canal—No. 27	270 feet by 45 feet
River lock to pass vessels around Galop Rapids only—No. 28	326 feet 9 ins. by 45 ft.
Total rise of lockage	15 feet 5½ inches
Normal draught	14 feet
Breadth of canal at bottom	80 feet
Breadth of canal at water surface	144 feet
Breadth between walls in Cardinal cut	88 feet
Minimum overhead clearance	No restrictions

This canal enables vessels to overcome the rapids at Pointe aux Iroquois, Point Cardinal and the Galop.

The canal is lighted by electricity.

From the head of the Galop Canal to the entrance to the Welland Ship Canal the distance is 229 miles.

Williamsburg Canals—Mileage and General Data

Mileage	Structure, Locality, etc.	Locks			
		Length Between Hollow Quoins	Minimum Width	Normal Draught	Lift
		ft. in.	ft. in.	ft. in.	ft.
	FARRAN POINT CANAL				
0·00	East entrance—Farran Point Village				
0·11	Lock 22—Farran Point	800 0	50 0	16 0	4·21
1·28	West entrance				
	Total lift				4·21
	RAPIDE PLAT CANAL				
0·00	East entrance—Farlingers Bay, Morrisburg				
0·19	Lock 23—Morrisburg	285 0	45 0	14 0	11·60
1·59	Statas Bay				
1·76	Mariatown				
2·80	Heagles Bay				
3·67	Lock 24—Guard Lock	270 0	45 0	14 0	.....
3·89	West entrance—Flaggs Bay				
	Total lift				11·60
	GALOP CANAL				
0·00	East entrance—Iroquois Village				
0·21	Lock 25—Iroquois	800 0	50 0	14 0	15·46
0·34	Bridge 4—Highway—Swing				
5·25	Bridge 5—Can. Nat. Rys. and highway—Swing				
5·83	Gates Bay				
6·42	Lock 27—Guard Lock	270 0	45 0	14 0	.....
6·42	Lock 28—River Lock	326 9	45 0	14 0	(6·0)
7·36	West entrance to canal				
8·19	Dyke				
8·64	Entrance to North Channel				
9·89	West end of North Channel dyke				
	Total lift				15·46

At low water stages of the St. Lawrence, draughts available at most locks opening into the river are curtailed. During navigation seasons the depths of water on the river gate mitre sills have been as low as the following, all in November, 1934:—

Lock 22—13·8 feet
Lock 23—12·6 feet
Lock 24—11·8 feet
Lock 25—14·1 feet
Lock 27—12·2 feet
Lock 28—11·3 feet

MONTREAL, OTTAWA, AND KINGSTON ROUTE

This route extends from the harbour of Montreal, passing through the Lachine Canal to Lake St. Louis and thence up the Ottawa River *via* the Ste. Anne lock and the Carillon and Grenville Canals to Ottawa; thence by the Rideau Canal, Rideau River and a series of small lakes and other watercourses and channels to Kingston on Lake Ontario, a total distance of 246·24 miles.

The total lockage between the harbour of Montreal and that of Kingston is 545 feet (385 feet rise and 160 feet fall) and the number of locks is 60.

The following table shows the intermediate distances from Montreal Harbour:—

Sections of Navigation	Intermediate Distance	Total Distance from Montreal
	Miles	Miles
Lachine Canal	8·74	.....
From Lachine to Ste. Anne lock	13·50	22·24
Ste. Anne lock and piers	0·12	22·36
Ste. Anne lock to Carillon Canal	27·00	49·36
Carillon Canal	0·94	50·30
From Carillon Canal to Grenville Canal	6·25	56·55
Grenville Canal	5·94	62·49
From Grenville Canal to entrance of Rideau navigation	56·00	118·49
Rideau navigation ending at Kingston	126·25	244·74
Rideau navigation—Tay Branch, from Rideau Lake to Perth	6·50	193·44

* At extreme high water in Lake St. Louis, this clearance is reduced to 33 feet 9 inches.
† The minimum depth provided for vessels passing both through the Carillon and Grenville Canals is 9 feet except during periods of very low water.

STE. ANNE LOCK

Length of canal	0·12 mile
Number of locks	1
Dimensions of lock	200 feet by 45 feet
Total rise or lockage	3 feet
Depth on sills (normally)	9 feet
*Overhead clearance	41 feet 5 inches (C.N.R. bridge)

This work, with guide piers above and below, surmounts the Ste. Anne Rapids between Ile Perrot and the head of the Island of Montreal, at the outlet of that portion of the Ottawa River which forms the Lake of Two Mountains, 23·5 miles from Montreal Harbour. The lock is electrically operated and lighted.

From the Ste. Anne lock to the foot of the Carillon Canal is a navigable stretch of 27 miles through the Lake of Two Mountains and the Ottawa River.

CARILLON CANAL

Length of canal	0·94 mile
Number of locks	2
Dimensions of locks	200 feet by 45 feet
Total rise or lockage	14 feet
Depth of water on sills	9 feet†
Breadth of canal at bottom	100 feet
Breadth of canal at water surface	110 feet
Minimum overhead clearance	45 feet

This canal overcomes the Carillon Rapids.

By the construction of the Carillon dam across the Ottawa River the water at that point is raised 9 feet, enabling the river above to be used for navigation. From the head of the Carillon Canal to the Grenville Canal the distance is 6·25 miles.

The locks are hand-operated and the canal is lighted by electricity.

GRENVILLE CANAL

Length of canal	5·94 miles
Number of locks	5
Dimensions of locks	200 feet by 45 feet
Total rise or lockage	43 feet
Depth of water on sills	9 feet 6 inches†
Breadth of canal at bottom	45 to 50 feet
Breadth of canal at water surface	50 to 80 feet
Minimum overhead clearance	42 feet (C.N.R. bridge)

This canal, by which the Long Sault Rapids are avoided, is about 56 miles below the city of Ottawa, up to which point the Ottawa River affords unimpeded navigation.

The locks are hand-operated and the canal is lighted by electricity.

Carillon and Grenville Canals—Mileage and General Data

Mileage	Structure, Locality, etc.	Locks			
		Length Between Hollow Quoins	Minimum Width	Normal Draught	Lift
		ft. in.	ft. in.	ft. in.	ft.
	CARILLON CANAL				
0·00	Lower entrance to Carillon Canal				
0·09	Lock 1	202 3	45 0	9 0*	10·50
0·76	Lock 2	200 9	45 0	9 0*	3·50
0·94	Upper entrance to Carillon Canal				
	Total lift				14·00
	GRENVILLE CANAL				
0·00	Lower entrance to Grenville Canal				
0·11	Lock 3	199 9	45 0	9 0*	13·20
0·27	Waste weir				
0·38	Lock 4	200 3	45 0	9 0	16·70
0·53	Waste weir				
1·27	Lock 5	200 0	45 0	9 0	6·60
1·27	Bridge—Stonefield—Swing				
1·64	Waste weir				
4·20	Lock 6	200 6	45 0	9 0	4·00
4·58	C.N.R. high-level bridge				
4·92	Highway high-level bridge				
5·58	Bridge 2—Bay Street, Grenville—Swing				
5·61	Lock 7	200 3	45 0	9 0*	2·50
5·94	Upper entrance to Grenville Canal				
	Total lift				43·00

Between the upper entrance to the Carillon Canal and lower entrance to the Grenville Canal there is a distance of about 6¼ miles.

* The draughts available at all entrance locks on the Carillon and Grenville Canals depend on the levels of the Ottawa River. During navigation seasons the lowest and highest depths recorded have been as follows:—

	Lowest	Highest
Lower Lock 1	10·00	22·90
Upper Lock 2	8·17	23·25
Lower Lock 3	10·42	29·00
Upper Lock 7	8·58	24·92

RIDEAU NAVIGATION

The Rideau Canal establishes a navigable waterway between the Ottawa River at Ottawa and the easterly end of Lake Ontario at Kingston, passing over the summit, which lies between the Ottawa Valley and that of the St. Lawrence. The general route of the canal may thus be described:—

By a series of eight locks in flight, it first ascends the steep escarpment from the Ottawa River and, proceeding across the city by an artificial cutting about 5 miles in length, enters the Rideau River at the Hogsback locks. The course of this river is then followed to Smiths Falls, distant about 61 miles from Ottawa, various dams and locks overcoming the differences in level encountered along the route. From this point, *via* Poonamalie lock, entrance is made into the first of three large expanses of water known respectively as Lower Rideau Lake, Rideau Lake, and Upper Rideau Lake. At the latter the summit level of the canal, about 275 feet above the Ottawa River, is reached. From this lake, communication is made with Newboro Lake, another large body of water.

The route then passes in succession through Clear Lake, Indian Lake, Opinicon Lake, Sand Lake, Whitefish Lake, Little Cranberry Lake, and Cranberry Lake. From the latter, it proceeds for about 4 miles through a narrow channel and thence into the Cataraqui River, dammed like the Rideau to make it navigable. Through two successive expanses of drowned land behind these dams, the channel runs to Kingston Mills, whence by a series of 4 locks, it descends into the natural channel of the Cataraqui. The river is then followed for a distance of 6 miles to the harbour of the city of Kingston, about 161 feet below the summit level.

The Tay branch of the canal affords communication *via* the Tay River between Beveridge Bay, about 10 miles beyond Smiths Falls on the lower Rideau Lake, and the town of Perth.

From the summit level of the canal the descending reaches on both the Ottawa and St. Lawrence Valley slopes are supplied also by reserve waters tributary to them. The water supply of the entire canal may be summarized as follows:—

1. The summit level, supplied by the Wolf Lake system discharging into the upper Rideau Lake.

2. The northeasterly descending level to Ottawa, supplied by the Tay River system discharging into the lower Rideau Lake.

3. The southwesterly descending level to Kingston, supplied by the Mud or Newboro Lake system discharging into Opinicon Lake and further supplemented by the flow from Loughborough Lake.

The following is a summary of mileage and other data relating to this canal:—

Navigation Distances—	Miles
Ottawa River to summit level at Newboro	84·74
Newboro to Lasalle Causeway, Kingston	38·79
	123·53
South Rideau Branch to Kemptville	2·90
Tay Branch, Big Rideau Lake to Perth	6·82
Portland Branch on Big Rideau Lake	6·48
Westport Branch on Upper Rideau Lake	5·25
Morton Branch on Whitefish Lake	1·62
Seeleys Bay Branch on Cranberry Lake	0·65
	147·25

Total Lift and Number of Locks at Normal Navigation Levels	Number of Locks	Total Lift in Feet
Ascending from Ottawa to summit level (Upper Rideau)	33	277
Descending from summit level to Kingston	14	161
	47	438
Tay Branch ascending to Perth	2	26
	49	464

Dimensions of all locks ..... 134 feet x 33 feet.

Draught ..... Normal, 5′6″; Minimum, 5′0″

Breadth of Canal Reaches:

Main Channel, bottom	60′
top	80′
Tay Branch, bottom (in rock)	40′
" (in clay)	60′
top	80′

Minimum overhead clearance:

Ottawa section only	26′6″
Ottawa to Becketts	27′0″
Becketts to Newboro	27′5″
Newboro to Kingston	30′0″

Normal length of navigation season:

Locks put into operation with skeleton staff, May 1.

Full operating staff commences about May 20.

Skeleton operating staff commences again about October 15.

Operation of locks ends about November 30.

Sunday operation usually commences for some sections on the third Sunday in May and continues to the last Sunday of September. All sections are usually open from the last Sunday in June to the second Sunday in September. Operation on Sundays is restricted to certain hours, as specified each season by Notices to Mariners.

Rideau Canal—Mileage and General Data

Miles from Ottawa	Structure, Locality, etc.	Locks				Overhead Clearance	Canal Prism
		Length Between Hollow Quoins	Minimum Width	Normal Draught	Average Lift		
	(Ottawa River—mean level 130·5 above M.S.L.; low in 1921—127·8; high in 1928—148·7)						
		ft. in.	ft. in.	ft. in.	ft.	ft. in.	miles
0·00	Ottawa River, Ottawa						
0·00	Ottawa Locks, 1 to 8, in flight	134 0	33 0	5 6	79·5	.....	.....
0·22	Plaza concrete arch and steel bridge	.....	.....	.....	.....	26·6	.....
0·54	Laurier Avenue steel arch bridge	.....	.....	.....	.....	27·3	.....
1·50	Isabella Street C.N.R. swing bridge						
1·56	Bridge 1—Vertical lift—Pretoria Avenue	.....	.....	.....	.....	29·6	.....
2·81	Bank Street concrete arch bridge	.....	.....	.....	.....	27·0	.....
3·40	Bridge 2—swing—Bronson Avenue						
3·72	Bridge 3—swing—C.P.R.						
4·17	Hartwell Locks, 9 and 10, in flight	134 0	33 0	5 6	21·5	.....	4·17
5·23	Hogsback Locks, 11 and 12, in flight	134 0	33 0	5 6	13·50	.....	1·05
5·25	Bridge 4—swing—Hogsback; canal enters Rideau River						
7·43	C.N.R. high level bridge	.....	.....	.....	.....	31·0	.....
9·25	Lock 13—Black Rapids	134 0	33 0	5 6	10·00	.....	.....
14·25	Long Island Locks, 14 to 16, flight	134 0	33 0	5 6	25·00	.....	0·13
14·33	Bridge 5—swing—Long Island, over Lock 16	.....	.....	.....	.....	.....	0·13
16·03	Bridge 6—swing—Manotick						
23·33	Bridge 7—swing—Kars						
30·48	Channel to Kemptville	South Rideau Branch to Kemptville					
33·38	Kemptville Wharf						
31·93	Becketts high level fixed bridge	.....	.....	.....	.....	27·0	.....
38·93	Lock 17—Burritts Rapids	134 0	33 0	5 6	10·50	.....	.....
39·43	Bridge 9—swing—Burritts Rapids	.....	.....	.....	.....	.....	1·50
41·83	Flight Lock 18—Nicholsons	134 0	33 0	5 6	6·33	.....	.....
42·09	Flight Lock 19—Nicholsons	134 0	33 0	5 6	8·00	.....	0·57
42·10	Bridge 10—swing—Nicholsons—over Lock 19						
42·50	Lock 20—Clowes	134 0	33 0	5 6	7·50	.....	0·07
44·30	Merrickville C.P.R. high level bridge	.....	.....	.....	.....	40·0	.....
44·65	Flight Lock 21—Merrickville	134 0	33 0	5 6	8·60	.....	.....
	Flight Lock 22—Merrickville	134 0	33 0	5 6	10·20	.....	0·53
	Flight Lock 23—Merrickville	134 0	33 0	5 6	5·90	.....	.....
44·81	Bridge 11—swing—Merrickville over Lock 23						
52·81	Lock 24—Kilmarnock	134 0	33 0	5 6	2·00	.....	0·25
52·82	Bridge 13—swing—Kilmarnock, over Lock 24						
56·22	Lock 25—Edmonds	134 0	33 0	5 6	9·10	.....	0·15
57·72	C.P.R. high level bridge—Smiths Falls	.....	.....	.....	.....	30·0	.....
57·72	Old Slys Locks, 26 and 27, in flight	134 0	33 0	5 6	16·00	.....	0·23
57·77	Bridge 15—swing—Old Slys						
58·52	Smiths Falls combined locks, 28, 29 and 30 in flight	134 0	33 0	5 6	25·50	.....	0·11
58·88	Bridge 17—swing—Beckwith Street						
58·86	Bridge 19—swing—Abbot Street						
58·88	Smiths Falls detached Lock 31	134 0	33 0	5 6	8·00	.....	0·19
58·98	C.N.R. bascule lift bridge						
60·98	Lock 32—Poonamalie	134 0	33 0	5 6	6·00	.....	1·06
61·58	Entrance to Lower Rideau Lake						
65·10	Diversion to Tay Branch	Tay Canal to Perth					
65·80	Canal entrance—Beveridge Bay—Rideau Lake						
66·00	Lock 33—Beveridges	134 0	33 0	5 6	13·0	.....	.....
66·09	Bridge 21—swing—Beveridges	.....	.....	.....	.....	.....	3·50
66·32	Lock 34—Beveridges	134 0	33 0	5 6	13·0	.....	.....
71·52	Bridge 22—swing—Craig Street, Perth						
71·77	Bridge 23—swing—Beckwith Street, Perth						
71·86	Bridge 24—swing—Drummond Street, Perth						
71·92	Perth Basin Wharf						

Rideau Canal—Mileage and General Data—Con.

Miles from Ottawa	Structure, Locality, etc.	Locks				Overhead Clearance	Canal Prism
		Length Between Hollow Quoins	Minimum Width	Normal Draught	Average Lift		
		ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	miles
71·96	Bridge 25—swing—Gore Street	(Total Length Tay Branch 6·12 miles)					
67·02	Bridge 26—swing—Rideau Ferry						
72·42 78·90	Diversion to Portland Portland Wharf	Channel to Portland Wharf on South Shore Big Rideau Lake					
80·02 80·02 80·08	Lock 25—The Narrows Bridge 27—swing—The Narrows Entrance to Upper Rideau Lake (Summit level 407·0 above M.S.L.)	134 0	33 0	5 6	4·0	.....	0·04
80·08 85·33	Diversion in Westport Westport Wharf	Channel to Westport Wharf on West Shore Upper Rideau Lake					
84·27	C.N.R. high level bridge	.....	.....	.....	.....	34·0	.....
84·34	Bridge 29—high level, highway	.....	.....	.....	.....	27·5	.....
84·74	Lock 36—Newboro	134 0	33 0	5 6	7·5	.....	1·06
89·74	C.N.R. high level bridge	.....	.....	.....	.....	34·0	.....
90·00	Lock 37—Chaffeys	134 0	33 0	5 6	11·0	.....	0·45
90·00	Bridge 30—swing—Chaffeys						
92·15	Lock 38—Davis	134 0	33 0	5 6	9·0	.....	0·08
96·45	Lock 39—Jones Falls	134 0	33 0	5 6	15·0	.....	.....
96·48	Jones Falls Basin						
96·59	Locks 40 to 42 in flight—Jones Falls	134 0	33 0	5 6	43·0	.....	.....
96·63	Bridge 33—swing—Jones Falls, over Lock 41						
99·38 101·00	Diversion to Morton Morton wharf and dam	Channel to Morton Wharf on Morton River					
101·88 101·53	Diversion to Seeleys Bay Seeleys Bay wharf	Channel to Seeleys Bay Village and Wharf					
103·08	Bridge 36—swing—Brass Point						
107·28	Locks 43 and 44 in flight—Upper Brewers Mills	134 0	33 0	5 6	18·50	.....	1·45
107·31	Bridge 37—swing—Upper Brewers, over Lock 44						
109·06	Bridge 39—swing—Lower Brewers, over entrance to Lock 45						
109·06	Lock 45—Lower Brewers Mills or Washburn	134 0	33 0	5 6	13·0	.....	4·25
118·81	Lock 46—Kingston Mills	134 0	33 0	5 6	.....	.....	.....
118·81	Bridge 41—swing—Kingston Mills						
118·83	Kingston Mills basin						
118·91	Locks 47 to 49 in flight—Kingston Mills	134 0	33 0	5 6	44·0	.....	0·25
118·93	C.N.R. high level bridge over Lock47–48	.....	.....	.....	.....	30·0	.....
123·53	Kingston-Lasalle Causeway bascule bridge						
	(Lake Ontario—Mean level, 245·8 above M.S.L.) (Standard low water, 243·0 above M.S.L.)						17·72

CANAL RULES AND REGULATIONS

For the assistance of mariners and shipping navigating the canalized portions of the St. Lawrence and Ottawa Rivers, the following paragraphs, as numbered, and concerning generally those canals dealt with in the "St. Lawrence River Pilot", have been extracted from "Rules and Regulations for the Guidance and Observance of those using and operating the Canals of Canada", published by the Department of Transport. 5

(For further details, penalties for non-observance, etc., the above-mentioned publication should be consulted.)

Authority

3. (1) The Canal Rules and Regulations are made under the authority of Sections 25 and 26 of the Department of Transport Act, being Chapter 79, Revised Statutes of Canada, 1952.

Customs Clearance Papers

7. Customs clearance papers of vessels must be produced and shown to any superintendent or lockmaster when required, or passage of canal may be refused.

Time When Canals Are Open

8. The canals will be open for navigation throughout each day and night, including Sundays, during the season of navigation, with the following exceptions:—

(*a*) The season of navigation on canals other than Main Route canals may start later and end earlier or later than on those constituting the Main Route. Information regarding the duration of the season of navigation on any canal for any year may be obtained from the Superintending Engineer of such canal.

(*b*) Most canals except Main Route canals have restricted Sunday hours, and announcement will be made each year at the time of opening of navigation of the Sunday opening rules as applying to that navigation season for these canals.

(*d*) On the Rideau Canal, the railway movable bridge at Smiths Falls is operated daily from 6 a.m. to 10.00 p.m. or during such other hours as may be determined from time to time by the Director.

Use of Canals to be at Owner's Risk

9. All vessels or rafts, when plying on or passing through the canals, shall do so entirely at the risk of their respective owners; and neither Her Majesty nor any agent or employee of Her Majesty shall be held liable or responsible for any compensation to the owner of any such vessel or raft, if for any reason whatever, it be prevented from using any canal, or part thereof, or be damaged, destroyed, detained or delayed while passing through the same.

Let Pass Requirements

10. (1) Except as provided in subsection 5, no vessel or raft shall pass through or use any canal or part thereof without a valid Annual or Trip Let Pass issued with respect to such vessel as set out in subsections (2) and (3), respectively, of this regulation, and such pass shall be shown to any lockmaster or other officer whenever and as often as required by such officer.

(2) An "Annual Let Pass", good for passage through any canal under the jurisdiction of the Department at any time during the season of navigation for which it is issued, may be obtained from any Superintending Engineer (or in the case of pleasure boats of forty (40) feet or less in length, from the local statistical officer, lockmaster or bridgemaster) on completion of an Annual Let Pass Agreement.

(3) A "Trip Let Pass" good for one passage, one way or one way and return as the case may be, through those canals or parts of canals between the port of departure and the port of destination of a vessel or raft not provided

with a valid Annual Let Pass, may be obtained by the master of the vessel on application to the local statistical officer, lockmaster or bridgemaster at the entrance to the first canal encountered on such voyage, on payment of a fee of Ten Dollars ($10.00) for each Trip Let Pass in excess of three during one navigation season (three such Trip Let Passes being issuable free during such navigation season) and upon completion by the owner, or by an authorized agent of the owner upon production of satisfactory evidence of such authorization, of a Trip Let Pass Agreement.

Draught of Water

14. (1) Every vessel, drawing five feet or over, navigating any canal shall be correctly and distinctly marked and gauged at the bow and stern so as to show her exact draught fore and aft, and no vessel without such gauge marks shall enter any canal.

(2) Whenever required, the master of any vessel shall produce a certificate, duly sworn to, from the last drydock the vessel was in, that her draught marks are correct.

Vessels in Tow

18. (1) Any vessel not using steering apparatus which is satisfactory in the opinion of the Director shall, when being towed by tractor or animal, be fastened to the source of traction by a tow line in such a way that there shall be at least one hundred (100) feet between the point where the line is fastened to the source of traction and the point where the line is fastened to such vessel.

(2) Except with the special permission, in writing, of the Director, the Superintending Engineer or the Superintendent, no more than one vessel shall at one time be towed by another vessel on any Ontario-St. Lawrence canal or on the Welland Ship Canal.

(3) Except with the special permission, in writing, of the Director or the Superintending Engineer, no vessel shall, on any Main Route canal, except on the Welland Ship Canal, be fastened alongside its towing vessel.

(4) When so required by the Director, the Superintending Engineer or the Superintendent, two tugs or other towing vessels shall be provided for towing any vessel through any Main Route canal.

(5) The owner of any vessel towing another vessel and the owner of the towed vessel shall be jointly and severally liable for any injury or damage caused by such towed vessel.

Speed of Vessels

19. Every vessel, after entering a canal, shall proceed, in the opinion of the Director, at a reasonable speed so as not to cause undue delay to vessels navigating in the same direction, but no vessel shall proceed in any canal at a speed greater, in the opinion of the Director or the Superintending Engineer or the Superintendent, than is reasonable and proper having regard to the traffic and use of such canal or so as to endanger the life or limb of any person or the safety of any property, which speed, when not otherwise specified, shall be taken as not exceeding six miles an hour.

Light on Vessels

20. Every vessel or raft navigating or lying moored in any canal or in any navigable channel between canals shall comply with the Rules of the Road issued by the Department respecting lights, applicable to the area in which such canal or channel is situated. No vessel shall use a searchlight for ordinary navigating

purposes in canal waters. If it becomes necessary to use a searchlight in a case of emergency, then the rays of the searchlight shall not be directed toward the pilot house or navigating bridge of another vessel nor toward the operating house of a canal bridge, or the control room of a canal lock, nor along the tops of lock walls on which canal employees are on duty. Vessels when lying at a pier awaiting their turn to enter a lock shall be considered as still under way and their lights are to be regulated accordingly.

Passing of Vessels

21. (1) The passing of vessels meeting or overtaking one another in a canal shall be governed by the Rules of the Road issued by the Department in such connection, applicable to the area in which such canal is situated, except as follows:—

(*a*) When meeting in East Basin 1 of the Lachine Canal, each vessel, unless both be tugs or other small boats, shall pass on the starboard side of the other.

(*b*) Is not quoted.

(*c*) When two vessels are approaching from opposite directions a swing bridge which does not provide separate channels for up and down traffic and which curtails the normal width of the navigation channel, the downbound vessel shall have the right of way, the upbound vessel holding back so that the vessels will pass each other at least 300 feet below the bridge.

(*d*) Except in the Welland Ship Canal, when two vessels, either one of which exceeds 100 feet in length, are approaching a bend in a canal from opposite directions, the downbound vessel shall have the right of way and the upbound vessel shall check its speed so as to avoid meeting in the bend.

(*e*) No vessel shall attempt to pass another vessel while within 300 yards of a lock, guard gate or bridge which both are approaching.

Passing Moored Vessels

22. Any vessel passing a vessel or vessels moored to a wharf, pier or the bank of any canal and any vessel passing construction or maintenance equipment working in a canal shall proceed at dead slow engine speed while so passing. For any violation of this regulation the owner of the offending vessel shall be liable to a penalty not exceeding One Hundred Dollars and shall also be liable for any damage to such moored vessel or vessels or to such construction or maintenance equipment resulting from failure to comply with this regulation.

Precedence at Railway Bridges

23. Precedence at railway movable bridges shall, at all times, be given to canal traffic, but no unreasonable delay shall be caused by any vessel, to railway traffic; the Director, or the Superintending Engineer or the Superintendent, shall be the judge as to the reasonableness of the delay. If the signal for the bridge is given by any approaching train while a vessel is between a quarter of a mile and half a mile distant from the bridge, the vessel shall slow down, stop if necessary, and await the passage of the train.

Vessels Approaching Lock or Bridge

24. (1) A whistle, bell, or horn shall be sounded at least half a mile before a vessel reaches any lock or movable bridge as an approach signal from the vessel; provided, however, that such signal shall be given to such extent only as, in the

opinion of the Director, or the Superintending Engineer or the Superintendent, is necessary to give the officer in charge of such lock or bridge timely warning to make preparations to receive the vessel at the lock or to allow it to pass through the bridge opening.

(2) It shall be the duty of the master of any vessel on approaching any lock, guard gate or bridge to ascertain for himself, by careful observation, whether such lock, guard gate or bridge is prepared to allow his vessel to enter or pass, and he shall govern the speed of, and otherwise control his vessel so as to avoid collision with and/or damage to the lock or guard gate or their gates, or the bridge or other canal works.

Vessels Waiting at Locks

25. (1) All vessels approaching a lock, while any other vessel is in or about to enter the same, shall be stopped and made fast to the posts or other devices placed for that purpose and shall be kept so tied up until directed by the officer in charge to proceed.

(2) When several vessels are waiting to enter any lock or canal, they shall lie in single tier, and at a distance of not less than 300 feet from such locks or canal, except where local conditions may, in the opinion of the Director, or the Superintending Engineer or the Superintendent, otherwise require.

(3) For the purpose of passing through a lock or canal, each vessel shall advance in the order in which it arrived at such lock or canal except that,—

(*a*) Specific classes of vessels shall follow such order of precedence as may be established from time to time by the Director.

(*b*) A vessel small enough to lock with a preceding vessel shall advance for that purpose ahead of its regular turn, if so instructed by the lockmaster.

(*c*) Vessels with barges in tow and, in special circumstances, other vessels, shall follow such order of precedence as may be determined by the Superintending Engineer or the Superintendent.

(*d*) An approaching vessel which is within such distance of a lock that she would be seriously or unduly delayed if another vessel which has arrived at the lock before her and over which she has precedence, under the provisions of sub-paragraphs (*a*), (*b*), and (*c*) of this paragraph, were locked before her, shall be accorded such precedence as she would have had if she were already at the lock.

Care in Entering and Leaving Locks

26. (1) No vessel shall attempt to enter or leave a lock until the gates are fully opened. The engines shall be stopped while the propeller wheel is passing over the mitre sills.

(2) The rate of speed of any vessel in entering a lock, when the bow of the vessel has reached the open gates, shall be such that the vessel can be moved into position by her lines alone without depending on the propeller wheel, and the engine shall be stopped when the bow of the vessel has reached the middle of the lock between the upper and lower gates, the remaining distance to be travelled by the vessel to be effected and the vessel controlled by means of lines attached to winches installed on the vessel's deck.

Vessel Men to Assist in Passing Vessels

27. Whenever any vessel is passing through a lock or bridge, the vessel's crew shall, whenever and in such numbers as required by the officer in charge of such lock or bridge, be assigned to assist in working the lock or bridge to

pass the said vessel through it, during which time the vessel men so assigned shall be subject to, act exclusively under, and comply with the instructions given them by the said officer.

Control of Vessels During Ice Conditions

28. Upon and after the formation of ice at the setting in of winter on any canal the Director may, notwithstanding the provisions of any other Regulation hereof, give priority to any vessel or refuse passage to any vessel or require any vessel to tie up for the winter at any location in the canal, and, after a date in mid-November in any year, to be announced by Notice posted at the upper and lower entrances of the affected canals, the master of any vessel shall promptly obey and comply with all instructions with respect to the movement of such vessel or its position or mooring or anchoring in the canal, given by the Director or the Superintending Engineer or the Superintendent or a dispatcher appointed for the purpose of regulating and controlling the passage of vessels. Vessels lying in wait and/or wintering in a canal as a result of such instructions shall pay the wharfage, lying up and wintering charges provided for in these regulations to the same extent as if their lying in wait and/or wintering were voluntary.

Vessel Lines Required

29. (1) Every vessel of two hundred registered gross tons and under navigating the canals shall be provided with at least two good and sufficient lines or hawsers, one at the bow and one at the quarter, and every vessel of more than two hundred registered gross tons shall be provided with at least four good and sufficient lines or hawsers, two leading astern, one leading ahead and one abreast line. When locking, such lines shall be made fast to the snubbing posts on the bank of the canal and lock; the two lines leading astern of a vessel of more than two hundred registered gross tons, pulling evenly, shall be made fast to separate snubbing posts; each line shall be attended by one of the vessel's crew, to check the speed of the vessel while entering the lock, to prevent it from striking against the gates or other parts of the lock, and to keep it in proper position while the lock is being filled or emptied. For any violation of this regulation the owner of the offending vessel shall be liable to a penalty of not less than Twenty-five Dollars and not exceeding Two Hundred Dollars and the vessel shall not be permitted to pass if, in the opinion of the Director or the Superintending Engineer or the Superintendent, the lines are considered not good or insufficient.

(2) Some slight variations as to relative position in placing of lines exist on the Main Route canals. In each case the instructions of the lockmasters are to be followed.

Working off a Lee Bank

30. No vessel when blown or otherwise held on a lee bank in a canal shall attempt to work herself off with her engine and wheel but shall run lines to the opposite side of the canal and heave out into the channel with her capstan.

Mooring and Fastening

31. (1) No vessel shall, whilst in any canal waters, be fastened or moored in such a manner as to obstruct navigation.

(2) An order given by the Director or the Superintending Engineer or the Superintendent with regard to the position, mooring, fastening or removal of any vessel in a canal, including its basins and approaches, or with regard to

the accommodation to be given by the master of such vessel to the master of another vessel shall be immediately complied with and obeyed. In the event of any such order not being complied with or obeyed within such period of time as is deemed reasonable by the Director or the Superintending Engineer or the Superintendent, the Director, or the Superintending Engineer or the Superintendent may cast off or cut away the hawsers or other fastenings of such vessel or cut away any ring or post to which such hawsers or other fastenings may be attached, and the Director or the Superintending Engineer or the Superintendent may take possession of such vessel and remove it to such point as he may see fit and he shall have the power of employing such number of men as he deems reasonable for that purpose, all at the expense of the owner of such vessel, and the owner of such vessel shall be liable for, and shall pay, all damages caused by or incidental to and costs incurred on account of any action taken by the Director or the Superintending Engineer or the Superintendent under the provisions of this regulation.

Tying to Electric Transmission, Light, Telephone or Telegraph Poles

32. No vessel or raft shall, under any circumstances, place a line of any nature on any electric transmission, light, telephone or telegraph pole or iron railing situated on canal property.

Berths for Vessels

33. (1) Berths for all vessels or rafts, when loading, unloading or stopping in any canal or approach thereto, will, whenever necessary, be assigned by the Director or the Superintending Engineer or the Superintendent.

(2) Such officer shall have power to change such berths from time to time as he may see fit.

(3) If the wharves are full, such vessels or rafts shall lie where indicated by such officer until a berth has been so assigned.

Loading or Unloading Otherwise Than at a Wharf

36. No vessel shall take on or discharge passengers or goods at any place other than a regular wharf, as determined by the Superintending Engineer, without the express permission in writing of the Director or the Superintending Engineer.

Loading or Unloading in Front of Leased Lots

37. Lessees of canal lots facing canals or basins shall, subject to the disallowance of the Director or the Superintending Engineer, have the first privilege of loading or unloading vessels on the unleased canal property fronting their respective leased lots; but the Director or the Superintending Engineer may, if he sees fit, allow any vessel to discharge on unleased canal property although fronting on leased lots.

Explosives, Dangerous Cargo, Oil Products, etc.

46. (1) No vessel whose cargo consists in whole or in part of high explosive or dangerous goods, such as dynamite, nitro-glycerine, gun powder, blasting caps, detonating fuses, corrosive liquid, oxidizing material, etc., shall pass through any portion of any canal unless and until written authority therefor is given by the Minister and then only subject to such conditions and restrictions as by such written authority are laid down.

(2) No such high explosive or dangerous goods shall be brought on, carried over or through or stored or used on canal land unless and until written authority therefor is given by the Minister and then only subject to such conditions and restrictions as by such authority are laid down.

(3) Vessels employed in carrying explosives and/or dangerous goods and/or flammable goods, such as fuel oil, crude oil or gasoline, shall, whether loaded, partly loaded or empty, whether under way, lying in wait, lying in wait and loading or lying in wait and unloading, observe and fulfill all requirements from time to time of the Director or the Superintending Engineer or the Superintendent pertaining to the loading, unloading and/or carriage thereof in canal waters.

(4) On oil tankers and similar vessels which, from time to time, carry flammable liquids on, in or through any canal and which are not equipped with fixed timber fenders, there shall be provided and placed, when docking or locking, a sufficient number of timber fenders between the vessel's hull and the dock or lock wall to prevent any metallic portion of such vessel from touching the side of the dock or lock wall.

Warning Signals on Vessels with Dangerous Cargoes

47. A vessel whose cargo consists, in whole or in part, of explosives or flammable or otherwise dangerous liquids shall fly by day a red flag and at night shall show a red light. These danger signals shall be such as to be visible all around at a distance of at least one mile and shall be displayed at the masthead or at another conspicuous position acceptable to the Superintendent.

Dropping Anchor

51. No anchor shall be dropped from any vessel in any lock or guard gate or entrance thereof or in any basin or navigation channel of any canal unless an emergency exists. The action of dropping anchor shall be reported to the Superintending Engineer or the Superintendent immediately and the owner of the vessel shall be responsible for all damages, repairs or salvage caused or necessitated by such action.

Blowing off Tubes

52. Vessels while within canal waters shall take the necessary precautions to avoid the issue of sparks or excessive smoke. No vessel shall blow off boiler tubes in any canal or harbour. For any violation of this regulation the owner of the offending vessel shall be liable to a penalty of not less than Five Dollars and not exceeding One Hundred Dollars and, in addition, vessels shall be held liable for damage due to issue of sparks or excessive smoke.

Refuse

53. (1) No person shall throw, dump or deposit, or cause to be thrown, dumped or deposited any ordure, refuse, filth, garbage, dead animal, dirt, ashes, putrid substances of any kind, stones, ballast, timbers, brush or other rubbish or papers within any canal boundaries or along or over the canal banks. All papers, litter, refuse, garbage or rubbish of any kind shall be placed in cans where provided for that purpose.

(2) No person shall throw, dump or deposit garbage, ashes, paper, ordure, litter, or other rubbish from any vessel into canal waters.

Control by Canal Officers

70. The lockmaster, bridgemaster, marine railway operator or dam-keeper on any canal shall, subject to any directions given by the Director or the Superintending Engineer or the Superintendent, be in direct charge of the lock, bridge, marine railway or dam works at the point at which he may be stationed and be held to occupy a responsible and representative position both towards the public users of the canal and towards the lockmen, bridgemen, or other employees at the point, and his instructions, conformable to these regulations and the above referred to directions, both in respect of the traffic and of the discipline of the other canal employees under him are to be carried out. He will report at once to his superior officer any violation of these regulations or disobedience or neglect of his orders.

Throwing Coins

85. The master of a vessel within the limits of any canal shall not allow passengers or employees on such vessel to throw coins, money or things of any description to persons along a lock or canal.

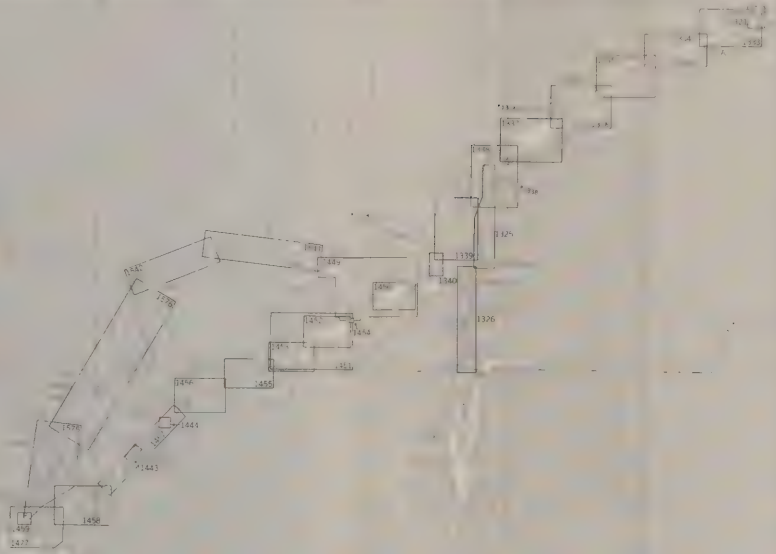
ICE.—Freezing over of St. Lawrence River.—The upper St. Lawrence usually freezes over from shore to shore for varying periods during the late winter months, except in the rapids sections. Between Prescott and Ogdensburg ice-breaking ferries maintain a passage the year round. At the upper end there is regular passage for sleighs and motor vehicles for from two to three months over the ice from Kingston to Cape Vincent, N.Y., via Wolfe Island. It is stated that some winters the waters of Lake Ontario freeze over for upwards of ten miles west of Kingston.

It has often happened that horse teams crossed the river from Gananoque to Clayton, N.Y. In this section it is reported as dangerous to attempt to cross on the ice east of Gananoque and west of Rockport, except after extreme cold weather and with the services of a guide.

From Alexandria Bay, N.Y., it is seldom possible to cross for more than a period of two weeks and the safer route is from Clayton, N.Y., to Gananoque.

The earliest date of closing of navigation at Kingston Harbour was December 15 and the earliest date of opening, March 2.

At Cape Vincent, N.Y., the average dates of season of navigation are opening, April 4, and closing December 25.



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REFERRED TO IN THIS WORK

*1338 Indicates that a plan of the place against which it is written is given upon Chart 1338

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CHAPTER I

QUEBEC TO TROIS RIVIERES

Charts 1321, 1333.

Quebec Harbour.—For a description of Quebec Harbour, see "St. Lawrence River Pilot, below Quebec".

Pointe Pizeau, Sillery, on the northwest side of the St. Lawrence River, is situated nearly $2\frac{1}{2}$ miles southwest of the citadel of Quebec. Between Wolfe Cove and Pointe Pizeau, there are several old loading blocks and cribs, lying outside the low water mark. These were used by sailing ships in the days of the flourishing lumber trade.

Wharf.—There is a Government wharf at Sillery with a depth of 24 feet (7^m3) alongside.

Light.—On the outer end of the wharf at Sillery, a *fixed green* light is shown, at a height of 31 feet (9^m4), from a white mast.

Fly Bank extends a quarter of a mile from the shore northeastward of Pointe Pizeau, the shoalest part drying at low water. The narrow channel inside Fly Bank has silted up and is no longer used.

Clearing mark.—Pointe au Pavillon, Orleans Island, in line with Pointe Levis, bearing about 039°, leads southeast of Fly Bank.

St. Romuald (*Lat. 46° 45′ N., Long. 71° 14′ W.*) is on the southeast side of the river, and 3 miles above the citadel. It is connected to Levis 4 miles to the northeastward by electric car and the Canadian National Railways. **Rivière Etchemin,** dry in the entrance at low water, empties into the St. Lawrence River, close northeast of St. Romuald. There is a large abandoned sawmill on the east side of the river mouth. Two-thirds of a mile in the same direction from the latter is a stream, also dry at low water, named **Rivière à la Scie.** Between the Canadian National Railways wharf at Pointe Levis and St. Romuald, the shore forms a slight bight, and is fronted by a bank, dry at low water, extending, near **Hadlow Cove,** a third of a mile from the shore. On this bank are built several piers; with the exception of that of the Imperial Oil Ltd., these are in a state of disrepair. **St. David Village,** with a church and spire, lies between St. Romuald and Levis, about $2\frac{1}{3}$ miles below the former.

Chart 1333.

Quebec Bridge is situated nearly $2\frac{1}{2}$ miles above Pointe Pizeau, Sillery, the northwest shore between forming a slight inward curve, and being fronted by an extensive flat dry at low water, to the low water edge of which are built numerous piers. Several of these are in poor repair. The least breadth of the river, at Quebec bridge, between the springs high waterline on each side, is 2,440 feet (743^m7). The width between the piers of the bridge is 1,800 feet (548^m6), the greatest depth here being $30\frac{1}{2}$ fathoms (55^m8).

Lights.—Two *fixed white* lights, 760 feet (231^m7) apart, placed under each end of the central span, mark the north and south limits of the channel, where there is the greatest head room, viz.: 150 feet (45^m7) at high water. Two *fixed red* lights, 1,300 feet (396^m2) apart are placed under the middle of the cantilever arms, 270 feet (82^m3) shoreward from each white light, where the clearance at high water is 88 feet (26^m8).

Chart 1333.

A *fixed green* light is exhibited on each side of the bridge, 10 feet (3^{m}0) north of the centre line of the central span.

Le Sault is the name given to the narrow channel under the bridge on account of the strength of the ebb stream, which at times attains a rate of 5·8 knots. The flood stream has a rate of 4·7 knots.

New Liverpool, (*Lat. 46° 45′ N., Long. 71° 16′ W.*) on the southeast side of the river, is situated 1¼ miles eastward of Quebec bridge. At low water, the drying bank here extends a little less than 200 yards (182^{m}9) from the shore.

Rivière Chaudière empties into the St. Lawrence River one-third of a mile eastward of Quebec bridge, and the channel into it, which is indicated by beacons, has a depth of 13 feet (4^{m}0). A depth of 12 feet (3^{m}7) can be carried a distance of about 450 feet (137^{m}2) above the highway bridge, which spans the narrows of the mouth, after which the river shoals rapidly. The clearance under the bridge at high water is 64 feet (19^{m}5).

Rivière du Cap Rouge.—From Quebec bridge, the north shore tends westward in a succession of slight curves 2⅙ miles to **Cap Rouge,** with its steep chocolate-coloured banks, and to the mouth of Rivière du Cap Rouge. The land close to shore, over this stretch, has a height of 175 to 200 feet (53^{m}3 to 61^{m}0). The mouth of the river is dry at low water and the bight is fronted by a bank which dries out a distance of 600 yards (548^{m}6). From Quebec bridge, the 5-fathom (9^{m}1) line on the north side of the river gradually extends farther out, until off the mouth of Rivière du Cap Rouge, it projects, in a tongue with 26 feet (7^{m}9) over it, bearing 167°, distant three-quarters of a mile from St. Felix church in Cap Rouge Village.

There are a number of wharves and piers in ruins off this shore. A submerged pier, in about 12 feet (3^{m}7) of water, lies near the entrance to Rivière du Cap Rouge, 1,000 yards (914^{m}4), 172° from the same church.

Cap Rouge Village is served by a branch line of the Canadian National Railways which joins the main line at Garneau Junction. A viaduct in connection with the railway is built across the mouth of the river and through the village.

Pointe à Basile is on the south shore, opposite Cap Rouge Village. A depth of 30 feet (9^{m}1) will be found 200 yards (182^{m}9) off the point and at that average distance between it and Quebec bridge. The land along this part of the shore is more uneven and slightly higher than that opposite.

Pointe à Basile leading lights.—The front lighthouse stands 260 feet (79^{m}2) eastward from the extremity of the point and is a white, square building with a red vertical stripe, the light being elevated 93 feet (28^{m}3). The rear white, skeleton tower with white slatwork on the channel side, is erected two-thirds of a mile, 077½° from the front light; its light is shown from an elevation of 200 feet (60^{m}9). Both are *fixed green* lights. From seaward, the front light is visible over an arc of 187½°, from a bearing of 051° through south to 238½°, with a strong beam of light visible in the alignment of the lights. The rear light is visible in the alignment of the lights and in the channel to upbound vessels from the time that it is abeam. A strong beam of light shows in the line of range which leads through the dredged cut in St. Augustin Shoal.

St. Nicholas is situated on the south shore, 3⅓ miles southwestward from Pointe à Basile.

Three-quarters of a mile northeast of St. Nicholas is the mouth of a small stream named **Rivière Auneuse.** A little northeast of this is **Baker Wharf,** between which and Pointe à Basile, the shore curves slightly inward and is

Chart 1333.

fronted by a bank with boulders and rocky patches, dry at low water, and extending an average distance of 300 yards (274^{m}3) from the shore. From the edge of this bank, the water deepens regularly and quickly to 30 feet (9^{m}1), at an average distance of 100 yards (91^{m}4), from Baker wharf to Pointe à Basile and eastward to Quebec bridge. Off St. Nicholas, the low water bank extends a quarter of a mile. St. Nicholas church is conspicuous. The land close to shore, one mile east of St. Nicholas, is 265 feet (80^{m}8) high.

Old Church Point.—The north shore of the St. Lawrence River from the mouth of Cap Rouge River trends southwest 1½ miles to Confederation Point, and thence about west 2½ miles to Old Church Point *(Lat. 46° 45′ N. Long. 71° 26′ W.)* forming in the latter stretch, a slight inward curve from which extends a bank strewn with boulders and rocky patches, dry at low water to a distance of a third of a mile.

St. Nicholas Point.—From abreast of St. Nicholas church, the high cliffy shore runs westerly nearly 2 miles to St. Nicholas Point, fronted by a bank of mud and boulders, dry at low water and extending off one-third of a mile.

A **reporting station** is situated on St. Nicholas Point. *See* page xxi.

St. Augustin Shoal is the name given to an extensive shoal, with 19 feet (5^{m}8) least depth at extreme low water, extending almost across the river, from the St. Augustin, or north shore. The channel through it, 550 feet (167^{m}6) wide, has been dredged to a depth of 35 feet (10^{m}7).

Light-buoys.—A black light-buoy, No. 15Q, showing a *flashing white* light, is moored 001°, distant 0·6 mile, from the reporting station on St. Nicholas Point. Red light-buoy, No. 16Q, showing a *flashing red* light, marks the eastern end of the cut through St. Augustin Shoal. Red light-buoy, No. 18Q, and black light-buoy, No. 19Q, showing a *flashing red* and a *flashing white* light, respectively, mark the western end of this channel.

The distance from opposite the Quebec custom-house to St. Augustin Shoal is 13½ miles.

Current.—In the channel through St. Augustin Shoal, the maximum rate of the ebb stream is about 3 knots; that of the flood is 2¾ knots.

Neuville.—The north shore of the river, from Old Church Point, trends in a general westerly direction 6¾ miles to Neuville in the district of Portneuf. A group of islets, known as Ilets Dombourg, lies on the dry low water bank 2½ miles eastward from Neuville. A shaly bank, dry at low water and strewn with boulders and rocky patches, fronts the whole of this shore. For a couple of miles west of Old Church Point, it is not more than 300 yards (274^{m}3) in breadth; thence westward, it increases in breadth as far as Ilets Dombourg where it is nearly a third of a mile broad. It then gradually contracts, to a pier a third of a mile eastward from Neuville where the breadth is 200 yards (182^{m}9); off the church the bank is a third of a mile broad.

A branch of the Canadian National Railways connects Neuville with Quebec and with the main line at Garneau Junction.

Wharf.—A wharf, 593 feet (180^{m}7) long, extends from the shore one-third of a mile eastward of Neuville. The face is 66 feet (20^{m}1) wide with one to 3 feet (0^{m}3 to 0^{m}9) of water alongside. In the berth on the west side, 100 feet (30^{m}5) long, there is a depth of 18 feet (5^{m}5) at high water.

Light.—A *fixed green* light is shown, at a height of 34 feet (10^{m}4), from a lantern on a freight shed at the outer end of Neuville wharf. It is visible over an arc of 158°, from 231° through west and north to 029°; a strong beam of light shows downstream directly towards St. Augustin Bar light-buoy No. 15Q.

Chart 1333.

Pointe Aubin (*Lat. 46° 41′ N., Long. 71° 30′ W.*) is situated on the south shore, $2\frac{1}{2}$ miles southwestward of St. Nicholas Point; the slate cliffs are about 100 feet (30^m5) high, with several streams (coulées) emptying into the river. Fronting this shore is an extensive shaly bank, covered at high water, and strewn with boulders and rocky patches, which, half a mile east of Pointe Aubin, attains a breadth of nearly two-thirds of a mile.

Buoy.—In this locality, and in a depth of 35 feet (10^m7), is moored a black can buoy, No. 21Q, bearing from Pointe Aubin, 000° distant nearly 0·70 mile.

St. Antoine, on the same side, is situated nearly $3\frac{1}{4}$ miles westward from Pointe Aubin, the cliffy shore between being fronted by a bank of the usual character, extending off nearly half a mile.

Pointe St. Antoine lies nearly half a mile northwestward from the village of that name.

Charts 1333, 1334.

Wharf.—A wharf extends in a northerly direction from a point situated about $1\frac{1}{2}$ miles westward of St. Antoine; it has a length of 350 feet (106^m7) and can only be approached towards high water.

Pointe-aux-Trembles Shoals.—These shallow banks extend to within a third of a mile of the shallow water fronting the south shore. A patch of boulders, dry at low water, lies 159° distant 0·88 mile from Neuville church. Nearly a mile northeast by east of this dry patch, the depth is only 4 feet (1^m2).

Light-buoys.—A red light-buoy, No. 24Q, showing a *flashing red* light and moored in 42 feet (12^m8) of water, marks the southeasterly projection of Pointe-aux-Trembles Shoals. The buoy bears about 032° and is distant 1·54 miles from St. Antoine church.

A black light-buoy, No. 23Q, showing a *flashing white* light, bears 039°, distant 1·93 miles from St. Antoine church and marks the northern edge of an isolated bank with 21 feet (6^m4) of water over it, lying near the steamer track, midway between Pointes Aubin and St. Antoine.

St. Antoine Traverse leading lights.—The front, square, steel skeleton tower, with white, wooden enclosed upper part, is erected on the southeast side of Pointe St. Antoine, and from a height of 68 feet (20^m7), exhibits a *fixed white* light, visible from all points of approach. The rear building of the same character stands, 1,050 feet (320^m0) $228\frac{1}{4}$° from the front lighthouse and shows, from a height of 203 feet (61^m9), a *fixed white* light visible, in the alignment of the lights, which alignment leads southeast of Pointe-aux-Trembles Shoals and midway between the two light-buoys above mentioned.

Chart 1334.

St. Antoine Upper leading lights.—The front square building, painted white with a red vertical stripe, is erected on the southwest side of Pointe St. Antoine and, from a height of 36 feet (11^m0), exhibits a *fixed white* light, visible in the alignment of the lights. The Traverse front light, above described, bearing 073°, distant 826 feet (251^m7), serves as the rear light of this upper leading line which leads south of two red buoys, Nos. 30Q and 32Q.

Ste. Croix.—From Pointe St. Antoine, the south cliffy shore of the St. Lawrence trends first southwest by west, then westward a total distance of $7\frac{1}{4}$ miles to abreast Ste. Croix two-spire church in the village of that name. Several streams flow into the river on this shore; that nearly 2 miles west of Pointe St. Antoine is known as **Bourret Brook.** The land near this stream is 160 feet (48^m8) high.

Chart 1334.

Wharves.—About half a mile northeastward from the church is a wharf, now in ruins, 600 feet (182^{m}9) long. Three-quarters of a mile northwestward of the church is another wharf, also in ruins, extending 1,700 feet (518^{m}1) from shore. The outer ends of both wharves are dry at low water.

This shore is bordered by an extensive bank, dry at low water, and strewn with boulders and rocky patches, the bank having a maximum width of half a mile.

Stream.—Anchorage.—The duration of the ebb stream at Ste. Croix is 8 hours; that of the flood, 4½ hours. The maximum rate of the former is about 2⅔ knots; that of the flood stream, 1¾ knots. Northeast gales cause a heavy sea for small craft, for which there is no shelter between Cap Rouge and Pointe Platon.

Buoys.—On the edge of the bank from this shore, and about equidistant from Pointe St. Antoine and the mouth of Bourret Brook, is moored a black can buoy, No. 27Q, bearing about 356°, distant 0·44 mile from St. Antoine wharf. Marking a projecting flat from the same shore, and situated about half-way between Pointe St. Antoine and Ste. Croix Village, is moored a similar buoy, No. 29Q.

Lights.—Ste. Croix.—Near the mouth of a stream and half a mile northeastward from Ste. Croix church stands a white square tower, exhibiting, at an elevation of 41 feet (12^{m}5), a *fixed white* light.

Ste. Croix leading lights.—The front light, situated upon the high bank of the river 1¾ miles eastward of Ste. Croix church, is shown at an elevation of 194 feet (59^{m}1), from a red-roofed lantern on a white, square, wooden tower with a red vertical stripe on the side facing the alignment.

The rear light, situated 2,476 feet (754^{m}7) 117° from the front light, is shown at an elevation of 266 feet (81^{m}4) from a square, steel skeleton tower with white, wooden enclosed upper part; this upper part has a white, wooden slatwork with a red vertical stripe on the side facing the alignment.

The lights, *fixed white,* are visible in their alignment which leads through Ste. Croix Bar dredged channel in a depth of 35 feet (10^{m}7). The front light is also visible downstream.

Tides.—*See* "Tide Tables for the Atlantic Coast of Canada" and page xxviii of this volume.

Tidal streams.—The mean rate of the flood stream is about 2 knots, that of the ebb stream 3 knots.

Les Ecureuils.—From Neuville (*Lat. 46° 42′ N., Long. 71° 35′ W.*), the north shore trends in a general west-southwesterly direction, with a deep inward curve, 5 miles to Les Ecureuils Village; the bank, dry at low water, extending out as much as two-thirds of a mile, is strewn with boulders and rocky patches. A branch of the Canadian National Railways affords connection with Quebec, and with the main line at Garneau Junction.

Les Ecureuils Bank is the name given to the shoaler portion of the extensive flat, continuous from Pointe-aux-Trembles Shoals, and stretching two-thirds of the way across the river between the dry low water margins. The boulders on Les Ecureuils Bank dry one foot (0^{m}3).

Light and other buoys.—The southern edge of this extensive bank is marked by five buoys. The eastern buoy, No. 28Q, nearly abreast of black can buoy, No. 27Q, is painted red and shows a *flashing red* light. A red light-buoy

Chart 1334.

showing a *flashing red* light, and marking a wreck, lies about 1½ miles southwestward from No. 28Q. A red conical buoy, 30Q, lies abreast of the black can 29Q. A red light-buoy, 32Q, exhibiting a *flashing red* light, is moored about 1½ miles southwestward of 30Q. A red light-buoy, No. 32½Q, showing a *flashing red* light, is moored about 7½ cables north-northwestward of No. 32Q. The fifth buoy, No. 34Q, also a red light-buoy showing a *quick-flashing red* light, is moored on the north side of the lower entrance to Ste. Croix Bar dredged channel. A black light-buoy 35Q, showing a *flashing white* light, marks the southern side of the upper entrance to Ste. Croix Bar channel.

Light.—On the south shore, opposite the red light-buoy marking a wreck, is a light, showing a *fixed green* light, at an elevation of 31 feet (9m4).

Cap Santé Village.—On the north shore, composed of clay and slate cliffs 60 to 70 feet (18m3 to 21m3) high, and 1⅔ miles westward from Les Ecureuils, is the entrance to **Jacques Cartier River,** spanned by a highway bridge. Privately maintained beacons lead to the wharf of a paper company on the east side of the river. Distant 1¾ miles further west is Cap Santé Village; it has a church with two spires, and a small wharf. A branch of the Canadian National Railways affords connection with Quebec and the main line at Garneau Junction.

Light and other buoys.—Red light-buoys 42Q and 44Q, both showing *flashing red* lights, mark the southwest edges of middle grounds on the northeastern side of Cap Santé Traverse. Black can buoy 41Q, lies abreast of buoy 42Q. Black light-buoy 45Q, showing a *flashing white* light, lies off the northeastern edge of a middle ground on the southwesterly side of Cap Santé Traverse, and bears 252° distant one mile from Cap Santé church. Black can buoy 43Q lies between 41Q and 45Q.

Ste. Croix Bar.—Northward from Ste. Croix Village, the shallow banks from both sides of the river join, forming a bar across which a channel 500 feet (152m4) wide and 35 feet (10m7) deep, has been dredged. The alignment of Ste. Croix leading lights, bearing 117°, leads through the middle of the channel.

Pointe Platon.—Three-quarters of a mile northwest of Ste. Croix, the south shore forms a slight point. From here the shore, with a long inward curve, trends in a general northwest by west direction 4¾ miles to a flat narrow point known as Pointe Platon *(Lat. 46° 40′ N., Long. 71° 50′ W.)*. There is a wharf here with a depth of 13 feet (4m0); on account of the action of the stream, this depth cannot always be relied on. The eastern portion of this shore is fronted by a drying bank of the usual character, 800 yards (731m5) broad, the western portion being about 350 yards (320m0) in breadth. The height of the land, a little back from the shore, is 150 feet (45m7).

Light-buoy.—A black light-buoy, 49 Q, showing a *quick-flashing white* light, marks the edge of the flat from Pointe Platon.

Tidal streams.—The mean rate of the ebb stream off Pointe Platon is 2¼ knots; the flood, 1¼ knots.

Above Ste. Croix Bar, the shallow water lies principally upon the south side of the river, depths under 18 feet (5m5) extending therefrom 9 cables.

Poulier Paget, with only 2 feet (0m6) of water on it, is the name given to a projecting part of the northwestern portion of this bank.

Buoy.—Poulier Paget is marked by a black can buoy, 47Q.

Chart 1334.

Anchorage for small vessels may be had in 12 feet (3m7) of water, with the outer end of Pointe Platon wharf bearing 272½°, distant a quarter of a mile. There is also anchorage in 5 to 6 feet (1m5 to 1m8), a quarter of a mile northwest of the wharf.

Portneuf River and Village.—From Cap Santé, the north shore of the St. Lawrence River trends in a general west-northwest direction, with a deep inward curve, 4 miles to the entrance of Portneuf River, the mouth of which is dry at low water, and the village of the same name. Between them, the shaly bank strewn with boulders and rocky patches, dries at low water for over half a mile.

Communication.—The Canadian Pacific Railway station, 35 statute miles from Quebec, is about a mile inland from the village. A branch of the Canadian National Railways affords connection with Quebec and with the main line at Garneau Junction.

Anchorage out of the strength of the stream, can be had northwest of the ships' track in 7 fathoms (12m8), with Portneuf church bearing about 356°, in line with the slope of a distant hill. Light draught vessels may anchor in 13 feet (4m0), 400 yards (365m7) nearer the Portneuf shore, on the same bearing.

Light-buoy.—A black light-buoy, 51Q, showing a *flashing white* light, is moored in about 30 feet (9m1) of water off Roche à l'Oiseau, which lies about one mile above Pointe Platon, just off the edge of the drying bank.

Cap Santé Traverse leading lights.—On the north side of the channel 1,100 feet (335m3) eastward of the mouth of the Portneuf River, the front light is shown at an elevation of 29 feet (8m8), from a small square, wooden tower surmounted by a white, square, wooden lantern. The rear light is shown, at an elevation of 76 feet (23m2), from a lantern on a pole with a white, diamond-shaped daymark with a black vertical stripe and small white shed at the base, located 2,025 feet (617m2) 297° from the front light. Both lights are *fixed amber.*

Portneuf leading lights.—Two *fixed green* lights are exhibited eastward of the river. The front light, about 4 cables eastward of the mouth of the river, is exhibited from a square, steel skeleton tower, painted red, with white daymark, at an elevation of 68 feet (20m7). The rear light is exhibited, at an elevation of 110 feet (33m5), from a square, steel tower about 3½ cables, 028° from the front light. The lights lead through a section of the channel southwest of Portneuf.

Deschambault.—From the mouth of Portneuf River, the shore trends southwest by west 3¼ miles to Deschambault situated on cliffs 70 feet (21m3) high, with its wharf, dry at low water, and church with two spires. The village has railway connection with Quebec.

The above portion of shore is fronted by a bank, covered at high water and extending off two-thirds of a mile in the southwestern portion.

Boulders.—Two patches of boulders, covered at high water, lie 173°, distant 0·6 mile, and 128° nearly half a mile from Deschambault church. Three cylindrical buoys surmounted by evergreen trees (balises) mark these shoals. About July 1, each year, these buoys are replaced by bushes fixed on the rocks.

Light-buoys.—A red cylindrical light-buoy, 52Q, showing a *flashing red* light, is moored on the northwest side of the channel, 2 miles westward of Pointe Platon. A black light-buoy, showing a *flashing white* light, is moored close eastward of the intersection of Lotbinière and Portneuf ranges. A red light-buoy showing a *flashing red* light, is moored south-southwestward of the westernmost of the above-mentioned boulder patches.

Chart 1334.

Richelieu Island.—From Pointe Platon, the southeast shore, composed of slate cliffs 80 to 180 feet (24^{m}4 to 54^{m}9) high, trends in a general southwest direction, with an outward curve for a total distance of a little more than 3 miles to abreast of Richelieu Island. The shaly bank, covered with mud and strewn with boulders and rocky patches, extends off a maximum distance of half a mile. The island is V-shaped, the sides being 1,500 feet and 1,100 feet (457^{m}2 and 335^{m}3) in length, the shorter, higher, southwestern side being above ordinary high water. There is a disused lighthouse on the island.

Barre à Boulard leading lights.—The front *fixed white* light is shown from a white, octagonal building on the north side of Richelieu Island Reef. The light is 40 feet (12^{m}2) high and visible from all points of approach. The rear *fixed white* light is shown from a red, square, steel skeleton tower, with white enclosed upper part and with white, wooden slatwork on upper portion of side facing channel. It stands near the shore, 054°, distant 1·71 miles from the front light. It is elevated 160 feet (48^{m}8) and is visible only over a small arc on either side of the alignment, which leads through Barre à Boulard dredged channel, and for nearly 2 miles above it.

Richelieu Rapids.—Abreast of Richelieu Island, the distance between the dry low water banks on either side is only a quarter of a mile, the breadth of the channel being 1,000 feet (304^{m}8), and 9 to 10 fathoms (16^{m}5 to 18^{m}3) deep. Here, the ebb stream runs 10 hours with a maximum rate of 5½ knots; the flood stream, 2 hours at springs, with a maximum rate of 1½ knots, but at neaps there is no perceptible flood stream.

Lotbinière (*Lat. 46° 37′ N., Long. 71° 56′ W.*), a village on the southeast shore, elevated 60 to 80 feet (18^{m}3 to 24^{m}4), is divided into two portions, that to the east being known as Lotbinière, containing a church with two spires, and the western portion, off which extends a wharf, being called Village de la Vieille Eglise. The wharf, one cable in length, with a depth of 3½ feet (1^{m}0) at its outer end at low water, is situated nearly 2¾ miles southwest of Richelieu Island. A mooring pier, 81 feet (24^{m}7) long, lies 90 feet (27^{m}4) to the southeastward of the wharf.

Lotbinière leading lights.—The front light, situated near the shore, 500 feet (152^{m}4) northeast of the wharf, is shown at a height of 51 feet (15^{m}5), from a white, square, steel skeleton tower surmounted by an enclosed wooden watch-room. On the side of the tower facing the alignment, is a white, wooden slatwork daymark. The rear light, situated 2,862 feet (872^{m}3), 222°, from the front light, is shown at a height of 161 feet (49^{m}1) from a steel, skeleton tower with a white, wooden lantern with a red roof. A white, wooden slatmark on the upper portion of the tower serves as a day beacon. These lights, *fixed green,* lead through Richelieu Rapids.

Off Village de la Vieille Eglise, a bank of the usual formation dries at low water for a quarter of a mile.

Leading lights.—Leading lights lead to the wharf at Vieille Eglise. The front light is situated on the wharf, 230 feet (70^{m}1) from its outer end; the rear light is on the south side of the highway, 750 feet (228^{m}5), 145°, from the front light. Both lights are *fixed red* and are shown from white masts with a diamond-shaped daymark attached.

Barre à Boulard, which before dredging, was a flat connecting the low water banks on either side of the river, has now a depth of 35 feet (10^{m}7), the breadth of the cut being 550 feet (167^{m}6). Through this cut the ebb stream has a maximum rate of 5½ knots, and the flood a maximum rate of 2 knots.

Chart 1334.

Anchorage may be found, in over 8 fathoms (14^{m}6), on the northwest side of the channel above Barre à Boulard, with Lotbinière front leading light, bearing south, distant 0·7 mile and Ilet Mayrand, bearing 244°, distant 0·5 mile.

Light and other buoys.—On the southeast side of Barre à Boulard cut are two buoys: black can buoy, 59Q, at the lower end of the cut and black light-buoy, 61Q, showing a *flashing white* light, at the upper end of the cut. A black light-buoy, 63Q, showing a *flashing white* light, lies on the southern edge of the channel, about 7 cables northwestward of the wharf at Village de la Vieille Eglise. A red light-buoy, showing a *flashing red* light, marks the turning point at the eastern end of Barre à Boulard.

Ste. Emmélie.—From the latter wharf, the southeast shore trends southwestward 2¾ miles to Pointe Langlois, the northeast entrance point of **Grande Rivière du Chêne,** immediately southwest of which river is situated the village of Ste. Emmèlie. The mouth of the river has a depth of one foot (0^{m}3) at low water springs, 9 feet (2^{m}7) at high water springs, and 6 feet (1^{m}8) at high water neaps. A highway bridge crosses the river a quarter of a mile above the mouth.

The shore between Lotbinière and Ste. Emmèlie is over 80 feet (24^{m}4) high, and, for 1½ miles from Lotbinière wharf, *(Lat. 46° 34′ N., Long. 72° 00′ W.).* is fronted by a continuous shaly bank, dry at low tide for a distance of half a mile, but thence to Point Langlois the shore bank is narrow, although there is a string of dry patches near the edge of the channel a mile from the shore.

Light.—Half a mile northeast of **Pointe Langlois,** and close to the south shore, is erected a white, square tower, exhibiting from a height of 47 feet (14^{m}3), a *fixed white* light.

Wharf.—The wharf at Ste Emmélie is 628 feet (191^{m}4) long, and is dry at low water; the depth at high water is 11 feet (3^{m}4).

Chart 1335.

Ste. Emmélie leading lights.—The front light, situated near the south shore, three-quarters of a mile westward from Ste. Emmélie church, is shown at a height of 128 feet (39^{m}0) from a red-roofed lantern on a red, square, steel skeleton tower, surmounted by an enclosed white, wooden watchroom, and with white slats with black vertical stripe on the side of the tower facing the alignment. The rear light, situated 3,660 feet (1,115^{m}6), 092° from the front light, is shown at a height of 183 feet (55^{m}8) from a similar structure. Both lights are *fixed green* and in line lead through the dredged channel from Cap Charles to abreast Deschaillons.

Buoys.—Marking the southeast side of the channel and deep draught Grondines anchorage abreast of Ste. Emmélie, are three black spar buoys, 65Q, 67Q, and 69Q. The bank dries in patches 200 yards (182^{m}9) southward of the two last mentioned buoys.

Petite Rivière du Chêne flows into the St. Lawrence River 1¾ miles westward of Ste. Emmélie; the entrance dries at low water and a highway bridge spans the river a quarter of a mile above the mouth.

Batture du Chêne is the name given to the northern portion of the extensive flats stretching 1¼ miles from the south shore just described.

Light-buoy.—The north edge of Batture du Chêne is marked by a black light-buoy, 71Q, moored at the easterly end of Grondines Channel, and showing a *flashing white* light.

Chart 1335.

Batture à Cadieux is the name applied to the northwestern side of the extensive flat above mentioned, and about half-way between Batture du Chêne and Cap Charles.

Light-buoy.—The edge of this batture is marked by a black light-buoy, 73Q, showing a *flashing white* light.

Cap Charles.—From Petite Rivière du Chêne, the south cliffy shore of the St. Lawrence River trends westward one mile to Cap Charles, 101 feet (30^m2) high. The deep water approaches Cap Charles within 150 yards (137^m2) of the shore.

Calvaire leading lights.—The front, white, square building with red roof stands near the calvary about two-thirds of a mile westward of Cap Charles. It shows a *fixed green* light at a height of 135 feet (41^m1). The rear, red, steel, skeleton tower, is situated 238°, distant 2,174 feet (662^m6) from the front light, and exhibits at a height of 181 feet (55^m2), a *fixed green* light. The alignment of these lights leads between Horseback Bar and Batture du Chêne.

Buoy.—A black can buoy, 75Q, is moored $1\frac{2}{3}$ cables northward from Cap Charles.

Anchorage may be found 200 yards (182^m9) southeast of this buoy.

Chart 1334.

Rivière Lachevrotière.—From Deschambault, the northwest shore trends west-southwest $1\frac{1}{4}$ miles to **Rivière Bélisle,** the mouth of which dries at low water. From here, the shore trends a little more southerly 1·60 miles to the entrance to Rivière Lachevrotière, also dry at low water; this stretch of cliffy shore is from 40 to 50 feet (12^m2 to 15^m2) high.

Communication.—Lachevrotière Village has connection with Quebec and Garneau Junction, by a branch of the Canadian National Railways.

Ilet Mayrand *(Lat. 46° 37′ N., Long. 71° 58′ W.)* is a cluster of boulders dry at low tide, situated near the edge of the extensive shorebank of the usual character. It lies on the northern side of the channel, and one-half mile from the wharf at Village de la Vieille Eglise.

Leading marks.—Pointe Deschambault and the right fall of Quebec Mountain in line, bearing 042°, leads through a portion of the channel from Ilet Mayrand to Batture Simon. This mark is visible only in clear weather.

Chart 1335.

Grondines.—From Rivière Lachevrotière, the northwest cliffy shore, 60 to 90 feet (18^m3 to 27^m4) high, runs nearly straight $2\frac{3}{4}$ miles in a west-southwest direction to Grondines Village, being fronted the greater part of the distance by a dry low-water bank, extending three-quarters of a mile from the shore.

Reporting Station.—A reporting station is established at Grondines in the old windmill tower. (*See* page xxi).

Wharves.—Abreast of the Grondines Point rear light is a wharf, 862 feet (262^m7) in length. The berth at the outer end is 80 feet (24^m4) long, with a depth of $8\frac{1}{2}$ feet (2^m5). Half a mile eastward of this wharf is a small wharf, now in ruins.

Chart 1335.

Anchorage, out of the strength of the stream, may be had in 7 to 9 fathoms (12^{m}8 to 16^{m}5), with Grondines rear leading light bearing about 286°. Small craft may anchor, in 6 to 7 fathoms (11^{m}0 to 12^{m}8), with the same light bearing 348°, distant 3½ cables.

Batture Simon.—Light-buoy.—The southwest extremity of the extensive dry bank, mentioned above, is called Batture Simon. It is marked by a red light-buoy, 66Q, showing a *flashing red* light.

Grondines Point *(Lat. 46° 35′ N., Long. 72° 04′ W.)* is an irregular, low projection on the north shore, nearly 2 miles west of Grondines Village.

Grondines Point leading lights.—The front light, situated on the point, is shown at an elevation of 24 feet (7^{m}3) from a square, steel framework tower, with enclosed, white upper part with red roof, and with red, open lower part, the structure standing on a concrete pier. The rear light, situated near the bank of the river, 8,113 feet (2,472^{m}8), 067° from the front light, is shown at an elevation of 66 feet (20^{m}1), from a white, square, wooden building. These lights are *fixed green,* and in line lead through the southwest portion of Cap à la Roche dredged channel.

Horseback Bar.—Buoys.—The ships' track, with depth of 35 feet (10^{m}7), passes between this bar and Batture du Chêne (page 9). A red conical buoy 72Q, marks the southeast edge of Horseback Bar. A spot, with a depth of 10 feet (3^{m}0) over it, lies on Horseback Bar about 100 yards (91^{m}4) north of the ship channel and 4,800 feet (1,463^{m}0) 202° from Grondines rear leading light.

Grande Pointe is the name of the flat, with 13 feet (4^{m}0) near its outer edge, extending two-thirds of a mile from Grondines Point, and to within 3 cables of Cap Charles.

Buoys.—The southeastern edge of Grande Pointe is marked by red light-buoy, 76Q, showing a *flashing red* light. Red conical buoy, 74Q, is moored 4 cables east-northeastward of the light-buoy.

Grondines Upper leading lights.—The front light, situated near the shore, 1·33 miles west-northwest from Grondines Point, is shown at a height of 21 feet (6^{m}4) from a white, square, wooden building with a red roof. The rear light, situated 1·18 miles, 046° from the front light, is shown at a height of 72 feet (21^{m}9), from a red, square, steel skeleton tower with white, wooden slats on the upper portion, and with white, wooden enclosed upper part. These lights, *fixed green,* in line lead northwest of Batture Belles Filles.

Ste. Anne de la Pérade is situated on both banks of Rivière Ste. Anne, one mile from the mouth. The principal buildings on the east side are the church with two square towers, college, and convent. It is a station on the Canadian Pacific Railway between Quebec and Montreal, being distant from the former, by rail, 53 statute miles.

La Pérade leading lights.—The front light, *fixed white,* is shown at a height of 61 feet (18^{m}6) from a white, steel, skeleton tower, surmounted by a white, wooden watchroom, and with white, wooden slatwork on side of tower facing alignment. It is situated about 1½ miles northeast of the mouth of the Rivière Ste. Anne, on the eastern end of Ile à la Batture, a small island lying close to the main shore. The rear light, *fixed white,* is shown at a height of 105 feet (32^{m}0) from a steel, skeleton tower, surmounted by an aluminium painted, enclosed wooden watchroom, and with aluminium painted slatwork daymark on side of tower facing alignment. It is situated 3,972 feet (1,210^{m}6), 272° from the

Chart 1335.

front light. The alignment of these lights, which coincides with that of the Ste. Emmélie leading lights, leads through Cap Charles dredged channel, from abreast of Cape Charles to Cap à la Roche Curve.

Poulier Rayer is the name given to the southern portion of the flat from the north shore, with 13 feet (4m0) on it, near the north edge of the channel, 1½ miles westward from Grondines Point.

Buoys.—The north edge of the dredged channel along this portion of the flat is marked by light-buoy 78Q, showing a *flashing red* light, and three red conical buoys, 80Q, 84Q, and 86Q.

Poulier Villeneuve.—This name applies to a ridge on the same flat, 2¾ miles westward on Grondines Point. The steamer channel that formerly existed north of the ship channel, abreast of Poulier Villeneuve, is to be no longer used, as this area has been made a disposal area by dredges, and breasting anchors are placed here when the dredges are at work.

Light and other buoys.—Cap à la Roche Curve and Channel are marked on the northerly side by four red light-buoys, 90Q, 92Q, 96Q, 100Q, each showing a *flashing red* light.

Note.—As the whole area on the north side of the ship channel from abreast the upper end of Poulier Villeneuve, a little above Cap à la Roche, to Grande Pointe, abreast Cap Charles, has been used as a disposal area by dredges working in this vicinity, the soundings are unreliable and this section should be avoided until a further survey has been made.

Batture Ste. Anne.—Under this name, very shallow banks extend from the mouth of Rivière Ste. Anne to within 2 cables of the southeast shore.

Light-buoy.—On the southeast edge of the batture, and west of Cap Lévrard, is placed a red light-buoy, 110Q, showing a *flashing red* light.

Cap à la Roche. *(Lat. 46° 33′ N., Long. 72° 08′ W.)*—From Cap Charles, the cliffy south shore trends with a slight inward curve, west 1½ miles to King's wharf, now in ruins, Deschaillons, and then west-southwest another mile to Cap à la Roche. The height of the land close to the shore is from 100 to 125 feet (30m5 to 38m1).

Deschaillons.—The population of Deschaillons was 1,693 in 1951. The Government wharf here has a pierhead 105 feet (32m0) long, with a depth of 11 feet (3m4) along the face. Half a mile westward of the Government wharf is a wharf in ruins.

Channel.—A channel has been dredged from deep water for 3,200 feet (975m4) to the brickyard wharf. It is 9 feet (2m7) deep and 100 feet (30m5) wide, with a basin in front of the wharf 250 feet (76m2) in width. The plant, located about a mile above the village, has a capacity of 70,000 bricks per day. Two beacons near the brickyard, in line, lead through the dredged cut.

Tides.—*See* "Tide Tables for Atlantic Coast of Canada" and page xxviii of this volume. The ebb stream in Cap à la Roche Channel attains a maximum rate of 5 knots.

Poulier du Calvaire, with 11 feet (3m4) over it, is the name given to the flat northwest of Cap Charles, and southward of the channel.

Buoys.—In addition to 75Q, described on page 10, black can buoys 77Q, 79Q, and 83Q and black light-buoy 85Q showing a *flashing white* light, mark the southwest side of the dredged channel between Cap Charles and Deschaillons, lying abreast of and about 550 feet (167m6), respectively, from light-buoy 78Q and red conical buoys 80Q, 84Q, and 86Q (*see* above).

Chart 1335.

Batture Cap à la Roche is the name given to the very shallow bank extending from the cape of that name; it dries in spots at low tide.

Light and other buoys.—The northern edge of this batture is marked by five buoys. Three black light-buoys, 89Q, 91Q, and 95Q, showing *flashing white* lights, lie abreast of red light-buoys 90Q, 92Q, and 96Q. Southward of the western entrance to this dredged channel, nearly abreast of 100Q, is moored black can buoy 99Q.

Cap Lévrard.—From Cap à la Roche, the south cliffy shore of the river extends southwest by west 2 miles to Cap Lévrard, the height of which is 95 feet (29^{m}0).

Batture Belles Filles or **Courteau** extends nearly a quarter of a mile from the shore, half a mile east of Cap Lévrard.

Light and other buoys.—Cap Lévrard Channel.—A black light-buoy, 103Q, showing a *flashing white* light, lies 275 feet (83^{m}8) south of Grondines Upper range and 10,554 feet (3,216^{m}9) downstream from its intersection with Batiscan range. A black can buoy, 105Q, lies 275 feet (83^{m}8) south of Grondines Upper range and 3,200 feet (975^{m}4) upstream from black light-buoy 103Q. Abreast of these two buoys, respectively, are moored red conical buoys 104Q and 106Q.

Cap Lévrard Curve.—A black light buoy, 107Q, showing a *flashing white* light, lies 275 feet (83^{m}8) south of Grondines Upper range and 4,210 feet (1,283^{m}2) downstream from its intersection with Batiscan range. A black can buoy, 109Q, lies 278 feet (84^{m}7) south of the intersection of Batiscan and Grondines Upper range. A black can buoy, 111Q, lies 275 feet (83^{m}8) south of Batiscan range, and 2,560 feet (780^{m}3) upstream from its intersection with Grondines Upper range. Abreast of these three buoys, respectively, are moored red conical buoy 108Q, red light-buoy 110Q, showing a *flashing red* light, and red conical buoy 112Q.

Anchorage, in about 25 feet (7^{m}6), may be found south of the channel and equidistant from black can buoys 109Q and 111Q, with St. Pierre les Becquets church bearing 214°, distant 1·88 miles.

St. Pierre les Becquets *(Lat. 46° 30′ N., Long. 72° 12′ W.)* is situated upon a projection of the south shore, 80 feet (24^{m}4) high, 2½ miles southwest by south from Cap Lévrard.

A channel 60 feet (18^{m}3) wide and 6 feet (1^{m}8) deep was dredged from deep water to the wharf at St. Pierre les Becquets and a basin at the wharf, 250 feet by 90 feet (76^{m}2 by 27^{m}4), was dredged to the same depth; the face of the wharf is 105 feet (32^{m}0) long.

Leading lights.—*Fixed white* leading lights, with diamond-shaped day-marks attached, lead to the wharf at St. Pierre les Becquets through the dredged channel. The front light is exhibited from a white, square building, erected at the inner end of the wharf, at an elevation of 13 feet (4^{m}0), and is visible from all points of approach. The rear light is exhibited, at a height of 54 feet (16^{m}5), from a pole erected 081°, distant 300 feet (91^{m}4), from the front light, and is visible only on the alignment of the lights.

Between Cap Lévrard and St. Pierre les Becquets, several streams (coulées) empty into the river through the cliffy coast, and the northwest half of this shore is fronted by a bank which dries, extending off half a mile and composed of mud, sand, and clay, strewn with boulders and rocky patches.

Batiscan Traverse *(Lat. 46° 32′ N., Long. 72° 12′ W.)*.—The width of this traverse is 550 feet (167^{m}6) and the depth 35 feet (10^{m}7).

Chart 1335.

Light and other buoys.—Batiscan Traverse.—A black can buoy, 113Q, lies 275 feet (83m8) south of Batiscan range, and at a point 2,240 feet (682m8) upstream from black can buoy 111Q. Red conical buoy 114Q is moored opposite black can buoy 113Q.

Batiscan Curve.—A black light-buoy, 115Q, lies 275 feet (83m8) south of Batiscan range, and 5,420 feet (1,652m0) downstream from its intersection with Gentilly range, to mark the lower end of the curve. Abreast this buoy is red conical buoy, 116Q, marking the northern side of the channel. Black light-buoy, 117Q, lies 865 feet (263m6) south of Batiscan range and 2,140 feet (652m3) downstream from its intersection with Gentilly range. Black light-buoy, 119Q, also lies 865 feet (263m6) east of Gentilly range and 2,140 feet (652m3) upstream from its intersection with Batiscan range. Black light-buoy, 123Q, is moored 275 feet (83m8) east of Gentilly range and 5,420 feet (1,652m0) upstream from its intersection with Batiscan range; it marks the upper end of the curve. All the above black light-buoys show *flashing white* lights.

Batiscan Channel.—Red spar buoy, 124Q, lies 275 feet (83m8) west of Gentilly range, and 8,220 feet (2,505m5) upstream from its intersection with Batiscan range; it marks the downstream end of the 30-foot (9m1) anchorage. Black spar buoy, 125Q, is moored 275 feet (83m8) east of Gentilly range, and 3,300 feet (1,005m8) upstream from black light-buoy 123Q. Black light-buoy, 129Q, showing a *flashing white* light, lies 275 feet (83m8) east of Gentilly range, and 6,600 feet (2,011m6) upstream from black light-buoy 123Q.

The ebb stream gradually increases in strength from Batiscan Traverse to Richelieu Rapids, excepting in the locality of the Grondines anchorage.

Batture St. Pierre is the irregular dry shore bank west of St. Pierre les Becquets.

Rivière aux Orignaux.—From St. Pierre les Becquets, the southeast shore of the St. Lawrence River runs nearly straight south by west 4¼ miles to Rivière aux Orignaux. The clay bank near the shore, 80 to 90 feet (24m4 to 27m4) in height, is intersected by several small streams and fronted by a bank of the usual character, covered at high tide, and extending half a mile from the shore. The ship channel in this locality is nearer the northwest side of the river.

Batiscan anchorage.—Roomy anchorage may be found in 31 feet (9m4) in a wide opening to the northwestward of the channel, opposite Batiscan, with the church in that place bearing 284°, distant 0·62 mile.

Anchorage buoys.—The north and south entrance points to this anchorage are marked by red spar buoys, 124Q and 128Q, and the western limit by red spar buoy 126Q.

Rivière Batiscan.—From the mouth of Rivière Ste. Anne, the low northwest shore of the St. Lawrence River trends southwest 2⅓ miles to the entrance to Rivière Batiscan, the expanse of dry bank gradually diminishing. The entrance to the river was dredged to a depth of 10 feet (3m0) in 1946. Two sets of beacons lead into this river.

Batiscan is situated close to the shore a mile south-southwest of the river of that name. The village has rail connection with Quebec and Montreal.

Government wharf.—The middle of the three wharves at Batiscan has a depth of 11 feet (3m4) at its outer end. A dredged channel leads to the wharf in a 232° direction. The channel is marked by two black and a red spar buoy, and has a width of 300 feet (91m4) and depth of 10 feet (3m0).

Chart 1335.

Tides.—*See* "Tide Tables for Atlantic Coast of Canada" and page xxviii of this volume.

Stream.—The duration of the flood stream, at springs, is about 1½ hours; at neaps, the current is always down. The tides above Batiscan are irregular.

Batiscan leading lights.—The front light is shown, at an elevation of 31 feet (9^{m}4), from a white, octagonal, iron lantern with a red roof, standing on a whitewashed, square, concrete pier with battered sides, situated 028° distant 1·07 miles from Batiscan church. The rear light, situated 242°, distant 1,613 feet (491^{m}7) from the front light, is shown at an elevation of 81 feet (24^{m}7) from a lantern with a red roof, on a brown, square, steel skeleton tower with white, wooden slatted upper portion and white, wooden enclosed upper part. These lights are fixed green, and in line lead through Batiscan Traverse. There is a ***reporting station*** at Batiscan.

Pointe Citrouille *(Lat. 46° 27′ N., Long. 72° 16′ W.)*.—From Batiscan wharf, the low northwest shore of the river trends south by west nearly straight 3 miles to Pointe Citrouille, with very little bank dry at low tide.

Light.—Near the shore at this point, a *fixed green* light, at an elevation of 51 feet (15^{m}5), is shown from a white, steel tower, with a stand-by oil light immediately underneath, situated on a square, concrete pier, with battered sides, 12 feet (3^{m}7) high.

Charts 1335, 1336.

Batture Perron is the name given to a flat, with 23 feet (7^{m}0) of water over it, situated on the northwest side of the channel, and midway between the above two places.

Light-buoy.—Marking this batture is red light-buoy, 132Q, showing a *flashing red* light, and moored 275 feet (83^{m}8) south of Gentilly range and 8,300 feet, (2,529^{m}8) upstream from red spar buoy 132Q.

Anchorage may be had in 7 fathoms (12^{m}8) off the western side of the channel about three-quarters of a mile below Pointe Citrouille light.

Champlain.—From Pointe Citrouille, the north shore, 10 to 15 feet (3^{m}0 to 4^{m}6) high, trends west by south for 3¼ miles to Champlain village whose church has two spires. The village had a population of 706 in 1951. The Canadian Pacific Railway station is about 1½ miles inland from Champlain.

Wharf.—There is a Government wharf 110 feet (33^{m}5) long with a depth of 10 feet (3^{m}0) along the face.

Champlain River joins the St. Lawrence River three-quarters of a mile southwestward of Pointe Citrouille light.

Champlain Upper leading lights.—The front light is shown at an elevation of 40 feet (12^{m}2) from a white, square tower situated about two-thirds of a mile westward of Champlain church. The rear light, situated 264°, distant 1,817 feet (553^{m}8) from the front light, is shown at an elevation of 109 feet (33^{m}2) from a brown, square, steel skeleton tower with white, wooden slatwork on upper portion and with a white, wooden enclosed upper part. The lights are *fixed green* and in line lead from Champlain almost to Pointe Citrouille.

Champlain Lower leading lights.—The front light is shown, at an elevation of 60 feet (18^{m}3), from a steel tower with a white slatwork day beacon situated

Charts 1335, 1336.

about 200 yards (182m9) southwest of Champlain church. The rear light, situated 041°, distant 2,042 feet (622m4) from the front light, is shown, at an elevation of 123 feet (37m5), from a brown, square, steel skeleton tower with white, wooden, enclosed upper part. The lights are *fixed green*; their alignment marks the axis of the channel from Champlain to Pointe à Bigot.

Light and other buoys.—A black light-buoy, 139Q, showing a *flashing white* light, marks the southern side of the channel abreast of Pointe Citrouille light. From Batture Perron to Pointe Citrouille, four red spar buoys, 134Q, 136Q, 138Q, and 140Q, and two black spar buoys, 135Q, and 137Q, indicate the channel.

Poulier Grandmont *(Lat. 46° 26′ N., Long. 72° 16′ W.)*, half a mile southwest from Pointe Citrouille, is a ridge through which a channel, with a minimum width of 450 feet (137m2) and 35 feet (10m7) deep, has been dredged. The action of the streams here necessitates frequent dredging.

Light and other buoys.—A red light-buoy, 2C, showing a *flashing red* light, is moored on the north side of Poulier Grandmont cut. On the same side of the cut and 4½ cables southwestward from light-buoy 2C, is red light-buoy 4C, showing a *flashing red* light. On the south side are black spar buoys 3C, south of 2C, and black can 5C moored south of 4C. A black light-buoy 7C, showing a *flashing white* light, marks the southern side of the channel at Poulier Turcotte, 1·5 miles above Pointe Citrouille light.

Poulier Carpentier, with 12 feet (3m7) over it, extends 400 yards (365m7) from the eastern part of Champlain Village.

Buoys.—The southern edge of this ridge is marked by red conical buoys 14C and 16C. A black light-buoy, 13C, showing a *flashing white* light, lies on the southern side of the channel and a little southward of 14C.

Poulier Dubord is a ridge with 5 feet (1m5) of water on it, extending 0·40 mile from the dry middle bank, known as Gentilly Shoal. (See page ..).

Light-buoys.—Marking the northern edge of Poulier Dubord are black light-buoys, 15C and 17C, both showing *flashing white* lights.

Pointe aux Roches.—From Rivière aux Orignaux, the southeast shore of the St. Lawrence River trends southwest by south 1⅔ miles to Rivière du Moulin. Thence, it trends west-southwestward 2⅓ miles to Rivière de la Ferme, the shore being fronted by flats that dry, extending off three-quarters of a mile. From Rivière de la Ferme, the irregular, low shore trends in a general west by south direction 2¼ miles to Pointe aux Roches, half a mile beyond Rivière Gentilly.

Gentilly is situated a third of a mile back from the shore, and midway between Rivière du Moulin and Rivière de la Ferme. It had, in 1951, a population of 648 and is marked by the usual church.

Gentilly leading lights.—The front light, situated on the extensive dry flat above mentioned and 017¾° distant 1·61 miles from Gentilly church, is shown at a height of 26 feet (7m9), from a lantern on a square, reinforced concrete pier with sloping sides, surmounted by a square, concrete watchroom. The rear light, 197½°, distant 1⅜ miles from the front light, is shown at a height of 101 feet (30m8), from a white, octagonal, iron lantern with red roof, on a brown, square, steel skeleton tower with white, wooden slatwork on the upper portion and with a white, wooden enclosed upper part. The lights are *fixed*

Chart 1336.

white, and their alignment leads through the channel from the upper end of the curve at St. Pierre les Becquets to the bend at Batture Perron.

Gentilly church, southward of the rear light, is on the alignment of the lights.

Gentilly Shoal *(Lat. 46° 25′ N., Long. 72° 20′ W.)* is the name given to a bank, dry at low water, composed of mud, sand and clay, strewn with boulders and rocky patches, lying in the middle of the St. Lawrence River, between Champlain and the mouth of Gentilly River. The dry bank is 2½ miles long, east and west, and a mile wide. The west side of this extensive bank is connected with Pointe aux Roches by a shallow bar and patches, dry at low tide. A detached drying bank, 1·3 miles long and 1½ cables wide, lies immediately northeastward of Gentilly Shoal, and is separated therefrom by a narrow channel 8 to 10 feet (2m4 to 3m0) deep.

Bécancour River.—From Pointe aux Roches, the low and irregular south shore trends nearly west-southwestward, 3¾ miles to the mouth of Bécancour River, which dries at low water. There is a depth of 2 to 4 feet (0m6 to 1m2) for a short distance inside the bar. Bécancour Village is situated on it, 2½ miles from the mouth. Close eastward of the latter is Bécancour Bay and a small stream named Petit Chenal d'en Bas, which, joining Bécancour River 1½ miles from its mouth, forms Ile Dorval, the north extremity of which (the east entrance point of Bécancour River) is named Bécancour Point. The ship channel passes a quarter of a mile off this point.

Bécancour leading lights.—The front light, at an elevation of 34 feet (10m4), is shown from a white, hexagonal, wooden lantern on a square, concrete pier with sloping sides, which stands on the flats off the westerly mouth of Bécancour River and 0·40 mile westward of Bécancour Point. The rear light, at an elevation of 79 feet (24m1), and situated on the shore 6,624 feet (2,019m0) 230° from the front light, is shown from a red, square, steel skeleton tower on a concrete pier with white, wooden slatwork on the upper portion and with a white, wooden enclosed upper part. The lights are *fixed white* and in their alignment lead from Pointe à Bigot to Batture Francoeur, off the mouth of Bécancour River.

Light and other buoys.—Marking the south side of the channel, abreast of Batture à Bigot, is black light-buoy, 23C, showing a *flashing white* light. Between this buoy and Bécancour Point, two black spar buoys, 25C and 27C, are moored on the southern side of the channel.

Batture à Bigot.—The north shore, from Champlain Village wharf, trends west-southwest, with a slight inward curve, 3 miles to the east end of Batture à Bigot.

Light-buoy.—Marking the northern side of the channel, opposite the intersection of the alignments of Bécancour Lower Traverse and Champlain Upper Course leading lights, is moored red light-buoy 20C, showing a *flashing red* light.

Lottinville Point is the name given to the slightly projecting north shore 2 miles west-southwestward of the east end of Batture à Bigot.

Provencher Shoal, with a least depth of 4 feet (1m2) and several rocky heads with less than 6 feet (1m8) of water over them, extends nearly 8 cables offshore abreast Lottinville Point. Between this shoal and the ship channel is **Batture Francoeur,** with a least depth of 16 feet (4m9).

Chart 1336.

Light and other buoys.—The south edge of Batture Francoeur is marked by a red light-buoy, 30C, exhibiting a *flashing red* light. Two red spar buoys, 34C and 36C, mark the northern side of the channel abreast Provencher Shoal.

Cap-de-la-Madeleine.—From Lottinville Point, the northwest shore of the river, composed of low cliffs 30 feet (9m1) high, trends in a general southwesterly direction, with a slight inward curve, 3½ miles to Cap-de-la-Madeleine, the northeast entrance point of Rivière St. Maurice.

The town of Cap-de-la-Madeleine.—Situated on the cape, elevated 40 feet (12m2), is the town of the same name, with a church and spire. The population in 1951 was 18,667. There is a Government wharf here, with 400 feet (121m9) frontage on the edge of the ship channel and a depth of 24 feet (7m3) alongside. Just below the Government wharf is a large paper mill in connection with which are several piers and a loading dock.

Lights.—Between Lottinville Point *(Lat. 46° 24′ N., Long. 72° 27′ W.)* and Cap-de-la-Madeleine are three pairs of leading lights:

Cap-de-la-Madeleine Wharf leading lights.—The front light, situated on the southwest corner of Cap-de-la-Madeleine wharf, is shown, at a height of 28 feet (8m5), from a steel pole with white, diamond-shaped daymark. The rear light, situated 869 feet (264m8), 242¾° from the front light, is shown at a height of 61 feet (18m6) from a similar structure. The lights are *fixed green* and lead from the intersection of the alignment of the Cap-de-la-Madeleine Village leading lights to the intersection of the alignment of Cap-de-la-Madeleine Lower leading lights.

Cap-de-la-Madeleine Village leading lights.—The front light, situated near the shore 0·38 mile below the village church, is shown at a height of 59 feet (18m0) from a white, square, wooden building. The rear light, situated 1,873 feet (570m9), 259¼° from the front light, is shown at a height of 122 feet (37m2) from a red, square, steel skeleton tower with white, wooden slatwork on upper portion and with a white, wooden enclosed upper part. The lights, which are *fixed green,* lead through Bécancour Upper Traverse dredged cut from Batture Francoeur light-buoy, 30C, to black spar buoy 39C.

Cap-de-la-Madeleine Lower leading lights.—The front light, situated near the shore, 2½ miles below the village church, is shown at a height of 51 feet (15m5) from a white, octagonal, wooden lantern on a white, square, wooden building. The rear light, situated 3,420 feet (1,042m4), 037½° from the front light, is shown at a height of 108 feet (32m9) from a brown, square, steel skeleton tower with white, wooden slatwork on the upper portion and with a white, wooden enclosed upper part. The lights, which are *fixed green,* in their alignment lead from Cap-de-la-Madeleine to Pointe des Chenaux, on Ile de la Potherie, if proceeding to Trois Rivières, or to abreast the west side of the mouth of Rivière St. Maurice, if Trois Rivières South Channel is followed.

From the mouth of Bécancour River, the southeast shore of the St. Lawrence River trends in a general southwesterly direction 3¾ miles to the wharf at Ste. Angèle-de-Laval. The bank, dry at low stages, composed of mud, sand, and clay, strewn with boulders and rocky patches, extends nearly half a mile from the Bécancour shore, narrowing gradually to the wharf.

The Canadian National Railways run from Ste. Angèle-de-Laval to Victoriaville (Arthabaska), situated on the main line 35 statute miles distant, and a ferry crosses from the wharf to Trois Rivières, in connection therewith.

Chart 1336.

There is a depth of 12 feet (3m7) at the wharf; the least depth in the approach is 13 feet (4m0). A black spar buoy, for the use of the ferry, is moored 1½ cables northwestward of the wharf.

Ste. Angèle-de-Laval, with a church and convent, is close east of the wharf. Half a mile east of it is Village du Port St. Nazaire. Ste. Angèle-de-Laval is connected with Trois Rivières by the above ferry service operated throughout the year. A branch line of the Canadian National Railways from Ste. Angèle-de-Laval connects with other lines of the same railway at St. Gregoire, Aston, and Victoriaville (Arthabaska).

Batture aux Veaux.—The southeast shore is fronted by flats with varying depths, the most projecting shallow part, 1¾ miles west of Bécancour, being named Batture aux Veaux, with a depth of 4 feet (1m2).

Light and other buoys.—The southern side of the ship channel from Bécancour Point to Batture aux Veaux is marked by the following buoys: black light-buoys, 33C and 37C; black spar buoy 39C; black light-buoys, 41C and 43C, the latter being on the northern edge of the batture. One half mile upstream from 43C is placed black light-buoy 45C, at the turn in the channel. These black light-buoys show *flashing white* lights. Red spar buoys 38C, 40C, and 44C mark the northern limit of deep water used as a turning area.

Anchorage.—Anchorage may be had in 30 feet (9m1) of water, north of the alignment of Cap-de-la-Madeleine village leading lights, with the front light bearing 251°, distant 1·20 miles.

Rivière St. Maurice.—From Cap-de-la-Madeleine to the city of Trois Rivières, the mouth of Rivière St. Maurice is 1¼ miles broad, and contains a group of islands, the two nearest the St. Lawrence River being named **Ile de la Potherie** (near the cape) and **Ile St. Quentin.**

A bridge spans Rivière St. Maurice 2·2 miles from the entrance, and to the Canada Iron Foundries wharf near the bridge, 11 feet (3m4) may be carried by keeping about 200 feet (61m0) off the cribs enclosing the booming ground.

Yacht Club St. Maurice is situated immediately above the bridge on the west bank of the river. There is a 5-ton crane available for minor repairs, and a marine railway is proposed (1952). Yachts will find safe anchorage here.

Lights.—The Canadian International Paper Company has placed booms and pontoons on the western side of Rivière St. Maurice, and on these pontoons are placed four *fixed red* lights.

On Ile de la Potherie are the mills of the Consolidated Paper Corporation, and from the upper end of the island a railway bridge crosses the east channel to the Cap-de-la-Madeleine shore. Access by land is also had to the island from Trois Rivières by a bridge from Ile St. Christophe, which lies in the St. Maurice above the lower islands. The southern end of Ile de la Potherie is known as **Pointe des Chenaux.**

Wharf.—There is a wharf at the point, with a frontage of 320 feet (97m5) and depth alongside of 30 feet (9m1). The branch line of the Canadian Pacific Railway to the island extends to the wharf.

There is a bar, with a depth of only 4 feet (1m2), at the entrance to the eastern branch of Rivère St. Maurice, between Ile de la Potherie and the Cap-de-la-Madeleine shore. Within the bar, a depth of 10 to 12 feet (3m0 to 3m7) can be carried to the railway bridge.

Chart 1336.

Wharf.—There is a small Government wharf on the northeastern side of this branch of the St. Maurice, one cable below the railway bridge. The depth at the outer end is 12 feet (3m7). (The wharf was in ruins in 1943).

Light and other buoys.—Southward of Pointe des Chenaux is moored a black light-buoy, 49C, showing a *flashing white* light, and abreast it a red conical buoy, 48C. Black light-buoy, 47C, showing a *flashing white* light, is moored 6 cables northeastward of Pointe des Chenaux. Light-buoy, 50C, painted in red and black horizontal bands, and showing a *flashing white* light, moored abreast the lower end of Ile St. Quentin, marks the junction of Trois Rivières Channel with Trois Rivières South Channel (*see* page 26). Black spar buoy, 51C, marks the southern side of Trois Rivières Channel, $2\frac{2}{3}$ cables southwestward of buoy 50C. Red spar, 52C, is moored on the northern side of the channel, $1\frac{3}{4}$ cables eastward of the Canadian International Paper Company wharf.

Between Trois Rivières and Ste. Angèle-de-Laval is a shallow middle ground, almost awash at low water, the northern edge of which is marked by black light-buoys, 55C and 59C, showing *flashing white* lights, and the southern side of red light-buoy No. 54C showing a *flashing red* light, and red spar buoy No. 56C.

Trois Rivières leading lights.—The front light, situated on the southwest side of Bureau wharf, about seven-eighths of a mile above the western side of the mouth of Rivière St. Maurice, is shown at a height of 64 feet (19m5) from a brown, square, steel skeleton tower with white, wooden slatwork on the upper portion, and with white, wooden enclosed upper part. The rear light, situated 1,265 feet (385m6), 236° from the front light, is shown at a height of 107 feet (32m6) from a similar tower. The lights, *fixed green,* in their alignment lead from Cap-de-la-Madeleine lower leading line to abreast black light-buoy 59C.

Trois Rivières Course leading lights.—The front light is shown at an elevation of 64 feet (19m5) from a lantern on a white mast, located about 2,000 feet (609m6) west of Rivière St. Maurice. The rear light is shown at an elevation of 117 feet (35m7), on the roof of the International Paper Company's mill, 1,590 feet (484m6), 023° from the front light. The lights are *fixed green* and in line, bearing 023°, lead through the middle of the upper part of Trois Rivières Harbour.

Charts, 1321, 1333.

Directions, Quebec to Trois Rivières.—Note.—While on the numerous leading lines between Quebec and Montreal, an excellent opportunity is afforded for testing the deviation of the compass.

From Quebec to Montreal, there is now a depth of 35 feet (10m7). The depths in the leading lines of the ship channel have been tested by a special sweeping apparatus and the leading lines should therefore be adhered to as closely as possible, even in places where the natural channel is broad and apparently deep, as there may be small patches which ordinary sounding has failed to discover.

The distance by the ship channel from abreast Quebec Customs-house to abreast the dome of the Ursulines convent at Trois Rivières is $67\frac{1}{2}$ miles.

On leaving Quebec, a vessel should not approach the northwest shore between Quebec and Sillery, nearer than the alignment of Pointe au Pavillon with the extreme of Pointe Levis, bearing 039°, this alignment leading less than 200 yards (182m9) southeast of Fly Bank. From abreast the upper end of New Liverpool, on the south shore, a course of 249° should be kept, leading in mid-channel for $4\frac{3}{4}$ miles, past Quebec bridge, until abreast of Confederation

Chart 1333.

Point, when the Pointe à Basile leading lights will be seen in alignment. These should be kept in alignment astern, the course being 257½°, for 3¼ miles to black light-buoy 15Q, lying a little more than half a mile east of St. Augustin Shoal. A vessel should continue on the Pointe à Basile leading line 3¼ miles from black light-buoy 15Q, until on the alignment of the St. Antoine Traverse leading lights bearing 228°. Keep this leading line for 1·4 miles, passing 275 feet (83m8) off black light-buoy 23Q, and rounding red light-buoy 24Q, at a distance of 500 feet (152m4), when the course is 243°, 4 miles, to the alignment of St. Antoine Upper leading lights and one-quarter mile southeast of the red light-buoy marking a wreck.

Chart 1334.

If the above course has been kept, a vessel should pass 100 yards (91m4) north of black can buoy 27Q, and 450 yards (411m5) south of red light-buoy 28Q. The course is now 253°, with St. Antoine Upper leading lights in alignment, astern, bearing 073°, for 2·4 miles to abreast red light-buoy 32Q. Thence on a course of 263° for 1·35 miles, passing red light-buoy No. 32½Q to the northward, to the alignment of the Cap Santé leading line. Hence to pass through the centre of the cut, 500 feet (152m4) wide and 35 feet (10m7) deep, the Ste. Croix leading lights must be kept in alignment astern, or the Cap Santé Traverse leading lights in line ahead, the course being 297°. This leading line may be kept for 5 miles, passing 85 yards (77m7) north of black light-buoy, 35Q, and through Cap Santé Traverse to abreast Pointe Platon *(Lat. 46° 40′ N., Long. 71° 51′ W.)*. On this course, a vessel will pass northeast of black can buoys 41Q, 43Q, and 47Q, and black light-buoy 45Q. The red light-buoys 42Q and 44Q will be left on the starboard hand, each distance 85 yards (77m7).

The course is now, for three-quarters of a mile, 280°, passing 200 yards (182m9) north of black light-buoy 49Q, until a tree comes in the hollow of a distant hill, bearing 266°. A vessel should keep this mark on ahead, steering 266° for half a mile. When Deschambault Point and Cap Charles Hill are in alignment, bearing 230°, keep them so for half a mile, passing 500 yards (457m2) northwest of black light-buoy 51Q. When Portneuf leading lights come in line astern, bearing 028°, keep them so for 1·10 miles, steering 208°, until a third of a mile south of red light-buoy 52Q.

The course is now 222°, for 1¾ miles, through Richelieu Rapids, with Lotbinière leading lights in alignment, until Barre à Boulard leading lights are in alignment, bearing 054°. This alignment kept astern, steering 234°, leads through Barre à Boulard dredged cut, 550 feet (167m6) wide and 35 feet (10m7) deep. After proceeding on this course for 2¾ miles, Deschambault Point will be seen in alignment with the southeast extreme of Quebec Mountain, bearing 042°.

Chart 1335.

This leading mark should be kept on, steering 222° for one mile, when Batture Simon red light-buoy 66Q, will be seen on the starboard bow, distant half a mile. Pass 200 yards (182m9) south of it and steer 242°, a little northward of black light-buoy 71Q, at the north edge of Batture du Chêne, for 1¼ miles, leaving on the port hand black spar buoys 65Q, 67Q, and 69Q. Pass close northwest of black light-buoy 71Q, and through the Grondines Channel on the alignment of Calvaire leading lights, bearing 236° for 1·7 miles, until abreast red conical buoy 74Q, and being about a quarter of a mile northeastward of black can buoy, 75Q, haul gradually westward to bring into alignment, astern Ste. Emmélie leading lights, or La Pérade leading lights ahead, the course being 272°, to enter the dredged channel extending from Cap Charles to Cap à la

Chart 1335.

Roche. This channel is entered between red light-buoy 76Q, on the starboard hand, and black can buoy 75Q, on the port hand, and is marked by red light-buoy 78Q, three red conical buoys, three black can buoys, and black light-buoy No. 85Q.

Caution.—This is a difficult part of the ship channel, as, in addition to the curve, there is an ebb stream with a rate of about 5 knots.

Proceed on the Ste. Emmélie leading line, 272°, for 1·54 miles to within a quarter of a mile from red light-buoy, 90Q, when haul very gradually westward, passing midway between it and black light-buoy 89Q, and on to the Grondines Point leading line. With these lights in alignment astern, proceed steering 247°, passing midway between red light-buoy 92Q and black light-buoy 91Q, red light buoy 96Q and black light-buoy 95Q, and at the upper end of the dredged channel, between red light-buoy 100Q and black can buoy 99Q.

When abreast of the latter, the course should be very gradually altered southward, until the Grondines Upper leading lights are in alignment, astern. Proceed with them so, steering 226° for 1·8 miles, passing midway between black light-buoy 103Q and red conical buoy 104Q, black can buoy 105Q and red conical buoy 106Q, black can buoy 107Q and red conical buoy 108Q, until within 250 yards (228^{m}6) of red light-buoy 110Q and black can buoy 109Q, marking the eastern end of Batiscan Traverse. Haul westward now, to bring Batiscan leading lights in alignment, bearing 242°.

Proceed in this course for 1¼ miles, between three red conical buoys on the starboard side and three black buoys opposite them on the port side, the westernmost of the latter being black light-buoy 115Q, and the other two being can buoys. When a quarter of a mile westward of 115Q, alter course gradually southward for 1½ miles, passing northwestward of black light-buoys 117Q and 119Q. When abreast black light-buoy 123Q, the Gentilly leading lights should be in alignment, bearing 198°. These should be steered for until abreast red light-buoy 132Q, a distance of 1¾ miles, passing 225 feet (68^{m}6) west of black light-buoys 123Q and 129Q (with black spar buoy 125Q between them), and passing also well east of red spar buoys 124Q and 128Q, and 225 feet (68^{m}6) on the same side of red light-buoy 132Q, marking Batture Perron.

From the position abreast 132Q, a course of 207° may be steered for 1·7 miles until 400 yards (365^{m}8) from red light-buoy 2C, passing between red spar buoys 134Q, 136Q, 138Q, and 140Q, and black spar buoys 135Q and 137Q, and black light-buoy 139Q.

Chart 1336.

A vessel should now haul sharply to starboard to bring the Champlain Upper leading lights in alignment, bearing 264°. This course should be steered for 2·8 miles through Poulier Grandmont and Poulier Carpentier dredged cuts, until abreast black light-buoy 15C. On this course, one black spar buoy, 3C, and black can buoy 5C and black light-buoys, 7C and 13C will be seen on the port hand, while red light-buoy, 4C, and red conical buoys 14C, and 16C will be seen on the starboard hand.

From abreast black light-buoy 15C, a vessel should haul gradually southward for half a mile, passing 150 yards (137^{m}2) northwest of black light-buoy 17C, until the Champlain Lower leading lights are in alignment, astern, bearing 041°, a very little to starboard of Champlain church. The course is now 221° on this alignment for one mile, until nearly abreast Pointe à Bigot, when the Bécancour leading lights should be seen in alignment ahead, bearing 230°. This

Chart 1336.

course is kept for 3 miles, or until a quarter of a mile from Batture Francoeur red light-buoy 30C, passing 225 feet (68m6) southeast of red light-buoy 20C, and the same distance northwest of black light-buoy 23C, and black spar buoys 25C and 27C.

Caution.—Southeast of Batture Francoeur red light-buoy 30C, the down stream, setting due east with a rate of 1½ knots, will be felt on the starboard bow and must be guarded against.

After hauling gradually westward round Batture Francoeur, the Cap-de-la-Madeleine village leading lights are brought into alignment bearing 259¼° and kept so for one mile, from abreast red light-buoy 30C, to 2 cables above black light-buoy 37C.

Passing northward of black spar buoy 39C, a 242¾° course is steered for one mile to pass on the same side of black light-buoy 41C and black light-buoy 43C. After passing the latter, a vessel should very gradually haul southward, so that at the distance of half a mile west-southwestward of 43C, the Cap-de-la-Madeleine Lower leading lights should be in alignment astern. The vessel should now be kept on this alignment, steering 217½°, one mile, if bound for Trois Rivières, until abreast red conical buoy 48C, when Trois Rivières leading lights should be brought on, bearing 236°. This alignment leads for 1½ miles as far as black light-buoy 59C, or until a berth is taken up at Trois Rivières wharves as required. It passes 100 yards (91m4) northwestward of red and black horizontal-striped light-buoy 50C, black spar buoy 51C and black light-buoy 55C, also 100 yards (91m4) southeastward of red spar buoy 52C.

CHAPTER II

TROIS RIVIÈRES TO SOREL

Chart 1336.

Trois Rivières, with a population of 46,074 in 1951, is situated on the west side of the mouth of Rivière St. Maurice, and by ship channel, from abreast the dome of the Ursulines convent, the distance to a point abreast the Quebec Custom-house is 67½ miles. The former is also distant from the north end of the Guard pier at Montreal, 70¾ miles.

Tides.—As will be seen by referring to the "Tide Tables" published annually by the Tidal and Current Survey Division of the Canadian Hydrographic Service, Department of Mines and Technical Surveys, and alluded to on page xxviii of this volume, the influence of the tide is felt here only to a small extent, the maximum rise and fall being one foot, the high and low water occurring, on the average, 4h. 45m., and 6h. 15m., respectively, later than at Quebec.

Communication.—Trois Rivières has railway communication with Quebec and Montreal by the Canadian Pacific Railway; with Grandes Piles on Rivière St. Maurice; and with the Canadian National Railways at Shawinigan Falls and Garneau Junction. On the southeast side of the St. Lawrence River, by means of the ferry to Ste. Angèle-de-Laval, Trois Rivières has connection with the Canadian National Railways at Aston and Victoriaville Junctions.

Reporting station.—There is a reporting station on the southwest end of Quai Bureau.

Wharves.—Beginning at the mouth of Rivière St. Maurice, the wharf facilities are: Canadian International Paper Company's wharf with berthing length of 1,320 feet (402^{m}3), and with a shed 480 feet (146^{m}3) by 160 feet (48^{m}8); the facilities here include four 2½-ton cranes for handling pulpwood, two coal towers of 200 tons per hour capacity each, two 2½-ton hoists for handling paper, railway tracks, water-main, electric power and light. Harbour Commissioners' wharf, with berthing length of 1,700 feet (518^{m}2), with six sheds of varying dimensions; there are railway tracks, electric light and water-mains. Canada Steamship Lines, Ltd., wharf with berthing length of 300 feet (91^{m}4) and a shed 350 feet by 50 feet (106^{m}7 by 15^{m}2). There is electric light but no water-main, cranes or hoists, and the wharf is used for the handling of general freight. Quai Bureau with berthing length of 2,000 feet (609^{m}6) and with shed 400 by 60 feet (121^{m}9 by 18^{m}3); this wharf is equipped with railway tracks, water-main, and electric light, and is used for handling sulphur and for storage. The St. Lawrence Coaling Company occupies 375 feet (114^{m}3) at the east end of this wharf as a coal depot and operates three steam locomotive cranes for handling coal, their combined capacity being 2,000 tons a day. Harbour Commissioners' wharf with berthing length of 2,735 feet (833^{m}6), including a slip with faces 500, 395, and 600 feet (152^{m}4, 120^{m}4, and 182^{m}9) in length, with two sheds each 400 by 60 feet (121^{m}9 by 18^{m}3); this wharf has railway tracks, water-main, electric light, and power and steam cranes. It is used for handling general freight. Harbour Commissioners' wharf, berthing length 925 feet (281^{m}9); there are no sheds on this wharf, but it is equipped with railway tracks, water-main, electric

Chart 1336.

light and power. This section is occupied by the Dominion Coal Company, which operates two steel Mead-Morrison discharging towers, with capacity of 700 tons per hour; this wharf is used for coal storage. West of the coal wharf (extreme west of port) the St. Lawrence Paper Mills have a concrete mooring pier 48 by 36 feet (14^{m}6 by 11^{m}0) with depths of 16½ to 18 feet (5^{m}0 to 5^{m}5) alongside and 23 to 20 feet (7^{m}0 to 6^{m}1) at a distance of 25 feet (7^{m}6) from the pier. Pulpwood ships are moored to the pier and unload into booms. The depth of the Canadian International Paper Company's wharf and the adjacent Harbour Commissioners' wharf is 27 to 29 feet (8^{m}2 to 8^{m}8). In 1944, the berths at Quai Bureau were dredged to 30 feet (9^{m}1). The berths on the east and west sides of the slip have a depth of 33 feet (10^{m}1). The berths along the face of the wharf occupied by the Dominion Coal Company, Limited, have a depth of 32 feet (9^{m}8).

The Limits of Trois Rivières Harbour are described as comprising "that portion of the River St. Lawrence lying between the eastern and western boundaries hereinafter described and extending in the Rivière St. Maurice to the northerly boundary of the city of Trois Rivières, where it crosses the Rivière St. Maurice, and shall include all water and beach up to tidal high water on both sides of the said rivers and on the shores of the islands contained within the harbour limits. The westerly boundary of the harbour shall be a line drawn parallel to and one mile easterly perpendicularly from the line joining the intersection with high water mark on the north shore of the River St. Lawrence of the boundary line of the parishes of Trois Rivières and Pointe du Lac and the intersection with high water mark on the south shore of the river of the boundary line of the parishes of St. Grégoire and Nicolet. The easterly limit shall be a line drawn through triangulation monument No. XII, situate on the north shore of the St. Lawrence River on Lottinville Point in the parish of Cap-de-la-Madeleine, and the triangulation monument No. XII$_1$ situate on the south shore of the St. Lawrence River on the extremity of Bécancour Point on Ile Dorval or Montesson in the parish of Bécancour."

The principal imports arriving at the port of Trois Rivières are coal, pig iron, sulphur, salt, moulding sand, and fuel oil, while the chief products exported are lumber, wood pulp, paper, grain, skins, boots and shoes, and cast iron pipes.

Manufactures.—A number of large manufacturing plants are located at Trois Rivières and vicinity; the Consolidated Paper Corporation with two mills, one on Ile de la Potherie and a second one on the eastern limits of Cap-de-la-Madeleine; the Canadian International Paper Company mill at the mouth of the St. Maurice, in Trois Rivières; the St. Lawrence Paper Mills Ltd. on the western limits of the city; in the city are the Wabasso Cotton Company mills, Canada Iron Foundries Ltd., and other concerns.

From Ste. Angèle-de-Laval, the southeast shore of the St. Lawrence River trends southwest by south, 1¾ miles to the mouth of the Godefroy River. In the same direction, one mile farther, is Marguerite River, a shallow stream, dry at low stages. Between Ste. Angèle-de-Laval and Godefroy River, an extensive flat stretches off half a mile, the eastern part of which has been used as a dumping ground; in places it dries from one to 4 feet (0^{m}3 to 1^{m}2).

Cables.—A telephone cable is laid under the St. Lawrence River from a point on the shore 4 cables northeast of the Godefroy River to a point about 1,000 feet (304^{m}8) above the coal dock at Trois Rivières. Vessels are warned against anchoring in the vicinity.

Chart 1336.

An overhead high power transmission line crosses the river about one mile above Trois Rivières front leading light. It is supported by two steel towers, 370 feet (112m8) above the surface of the river. The span is 4,800 feet (1,463m0) in length and the minimum headroom, or clearance, at high water is 160 feet (48m8), but at the centre line of the ship channel there is a clearance of 170 feet (51m8).

A telegraph cable crosses about 80 feet (24m4) east of the aerial transmission line, continuing up the Godefroy River. Mariners are warned not to anchor in the vicinity of this cable.

Radio Mast *(Lat. 46° 19′ N., Long. 72° 34′ W.).*—On the northwest bank of the river, one-half mile southwestward of the transmission tower, is a conspicuous radio mast.

Anchorage.—An anchorage on the north side of the river, extending about a mile downstream from abreast the rear light of Ste. Angèle range, is marked on the north side by three red spar buoys.

Prohibited anchorage.—Anchorage is prohibited between buoy No. 61C and the easterly limit of the official anchorage, 1,500 feet (457m2) westward of the transmission line.

Trois Rivières South Channel.—The new ship channel past Trois Rivières, 550 feet (167m6) wide and 35 feet (10m7) deep, is a continuation of Cap-de-la-Madeleine Upper course to abreast the west side of the mouth of Rivière St. Maurice, where it bends a point to the northward on to the alignment of the Ste. Angèle leading lights, to its intersection with Trois Rivières course.

Buoyage.—South Channel is marked at the lower end by black light-buoy 49C, and light-buoy 50C, painted in red and black horizontal bands, and both showing *flashing white* lights. Red light-buoy 54C showing a *flashing red* light is moored about 4 cables south-southeastward of the western entrance point of Rivière St. Maurice. The junction of the channel with the Trois Rivières course is marked by black light-buoy 61C, showing a *flashing white* light, moored abreast the upper end of the wharf of the Dominion Coal Co. Ltd. A black light-buoy, No. 57C, showing a *flashing white* light, and a red spar buoy, No. 56C, are moored 6 cables above buoy No. 54C.

Ste. Angèle leading lights.—The front light is shown, at a height of 33 feet (10m1), from a red, square skeleton tower surmounted by a white watchroom and white, square lantern with a red roof, situated on the north shore of the river 2 miles above Trois Rivières. The rear light is shown, at a height of 88 feet (26m8), from a similar structure located 1,500 feet (457m2) from the front light. The lights are *fixed green* and in line, bearing 228½°, mark the centre line of the upper part of the new South Channel.

Light-buoy.—A black light-buoy, 63C, showing a *flashing white* light, is moored about 3,500 feet (1,066m8), 131° from Ste. Angèle range front light.

Port St. François wharf.—From the Marguerite River, the southeast shore trends a little more westerly, rather over 3 miles, to Port St. François wharf, being fronted by a bank, which at low stages of the water dries off 300 yards (274m3). Between Godefroy River and Port St. François wharf, the soundings are even, there being a depth of 30 feet (9m1) at an average distance of a quarter of a mile from the shore. The face of the wharf is 100 feet (30m5) in length and the depth alongside is 12 feet (3m7). This is the landing place for Nicolet Village, distant by road about 4 miles.

Charts 1336, 1337.

Port St. François leading lights.—The front light, situated about 300 feet (91^{m}4) west of the wharf, is shown from a red roofed, white, octagonal, iron lantern on a whitewashed, square concrete pier with battered sides. The light is elevated 33 feet (10^{m}1). The rear light, situated 064¼°, distant 789 feet (240^{m}5) from the front light, is shown from a red-roofed lantern on a brown, steel, square, skeleton tower with white, wooden slatwork on upper portion and with a white, wooden enclosed upper part. The structure stands on a white-washed, square, concrete pier with battered sides. The light is elevated 72 feet (21^{m}9). These lights are *fixed white* and their alignment marks the axis of the channel through Batture au Fer and Poulier Laforce.

Anchorage, in 8 to 9 fathoms (14^{m}6 to 16^{m}5), may be had with the outer end of Port St. François wharf bearing 224°, distant 1·10 miles.

Nicolet River.—From Port St. François, the southeast shore trends southwest by west, 2 miles to the mouth of the Nicolet River, which joins the St. Lawrence River at the east end of Lake St. Peter. The bank, dry at low water, and the flat off it are known at Batture aux Outardes. In 1940, the depth over the bar at the mouth of the river was 4 feet (1^{m}2). The town of Nicolet is about 2 miles from the mouth. There is a wharf on the east side of the river, three-quarters of a mile from the mouth, with a depth of 9 feet (2^{m}7) alongside. There are two wharves at the town.

Beacons.—The west side of the river mouth is protected by a riprap breakwater, 3,500 feet (1,066^{m}8) in length. A pair of beacons lead from the ship channel into the mouth of the river, to abreast the first bend of the breakwater.

Nicolet Traverse leading lights.—The front light, situated on the flat a little east of the mouth of the Nicolet River, is shown at a height of 29 feet (8^{m}8), from a white, hexagonal, cast iron lantern on a concrete pier, 19 feet (5^{m}8) high, with battered sides. The rear light, situated 4,250 feet (1,295^{m}4), 108° from the front light, is shown at a height of 100 feet (30^{m}5), from a white, square, wooden, red-roofed lantern on a white, square, steel skeleton tower with white, wooden slatwork on upper portion and surmounted by a white, wooden watchroom. The lights, which are *fixed white*, in their alignment lead through Nicolet Traverse.

Nicolet, with a population of 4,084 in 1951, is situated on the northeast side of the river of that name, and distant nearly 2 miles from its mouth. It is connected by highway with Ste. Angèle-de-Laval, and a branch of the Canadian National Railways connects it with the main line at St. Leonard Junction, distant 14½ statute miles. The wharf is 1½ miles below the town.

Light-buoy.—Black light-buoy 65C, showing a *flashing white* light, is moored about 2 miles northeastward of Port St. François wharf, and marks the south side of the channel at this point. Red light-buoy, 2L, showing a *flashing red* light, is moored about 8 cables northeastward of Port St. François rear light.

Poulier Laforce *(Lat. 46° 16′ N., Long. 72° 38′ W.)*, with 2 feet (0^{m}6) of water over it, is the name given to the southeast tongue of Pointe du Lac shoal.

Light and other buoys.—Poulier Laforce is marked by a red light-buoy, 4L, showing a *flashing red* light. Abreast this buoy, and on the opposite side of the channel, is moored black spar buoy 3L.

Current.—Between Port St. François and Poulier Laforce, the current flows eastward at a rate of about 2 knots.

Charts 1336, 1337.

Batture au Fer.—Buoys.—This batture, with 7 feet (2^{m}1) of water on it, lies half a mile west of Poulier Leforce, and is marked by a red conical buoy, 6L, and a red spar buoy, 8L.

Pointe du Lac.—From Rivière St. Maurice, the low northwest shore of the St. Lawrence River trends southwest by south 3¼ miles, and thence west-southwest 4 miles to Pointe du Lac, elevated 50 feet (15^{m}2), at the east extremity of Lake St. Peter. The eastern portion of this part of the shore is fairly steep-to, a depth of 30 feet (9^{m}1) being found at an average distance of 150 yards (137^{m}2). The western portion of this low shore is irregular and fronted by extensive flats, part of which dry at low stages of the river.

Pointe du Lac leading lights.—The front light, situated 195°, distant 1¼ miles from Pointe du Lac church, is shown from a red, octagonal, iron lantern, rising from the red roof of a white, square, wooden building on square, concrete pier standing in 5 feet (1^{m}5) of water. The height of the light is 19 feet (5^{m}8). It is visible over an arc of 270°, from 281¼° through north, east and south to 191¼°, with a strong beam of light showing in the alignment of the lights and over an arc of 3° on each side of it. The rear light, situated 056¼° from the front light, is shown from a red octagonal lantern on a brown, square, steel skeleton tower surmounted by a white, wooden watch room. The light is elevated 146 feet (44^{m}5). Both lights are *fixed white* and their alignment leads from the curve in Lake St. Peter above Pointe du Lac 5¼ miles to Yamachiche Bend.

Pointe du Lac Shoal is the name given to the shallow flat extending from the point of that name. Its southern part takes the name Batture à Biron, with 12 feet (3^{m}7) of water over it, between which the Banc des Anglais, extending from the Nicolet shore, a channel 450 feet (137^{m}2) and 35 feet (10^{m}7) deep, has been dredged.

Pointe du Lac Village *(Lat. 46° 17′ N., Long. 72° 41′ W.),* with church and spire, is situated near the shore of Lake St. Peter, one mile northwest of the point; a highway joins the village to Trois Rivières. It is nearly midway between Quebec and Montreal by Canadian Pacific Railway, the station being half a mile back of Pointe du Lac Village. Between the latter and the point, Rivière aux Sables empties into the St. Lawrence River.

Light and other buoys.—Marking the entrance to this cut from the southeast is moored black light-buoy 9L, showing a *flashing white* light. It lies close south of the axis to the channel, 0·57 mile from Nicolet front leading light. On the opposite side of the cut, and about the same distance from the light is moored a red spar buoy. 10L. On the southwest side of the channel, 1·24 miles from the same light, is moored black light-buoy 13L, exhibiting a *flashing white* light. Abreast the light-buoy, and on the opposite side of the channel is moored red spar buoy 14L. About midway between light-buoy 13L and 9L is moored a black spar buoy, 11L, abreast of which is *flashing red* light-buoy, 12L.

Moored on the south side of the channel in Curve No. 3 are black light-buoys 17L and 21L, showing *flashing white lights.* Midway between light-buoys 13L and 17L is placed black spar buoy 15L, and midway between light-buoys 17L and 21L is moored black spar buoy 19L. On the north side of the channel, opposite black light-buoy 17L, is placed red spar buoy 16L.

Red light-buoy 22L, showing a *flashing red* light, is moored in 32 feet (9^{m}8) of water opposite black light-buoy 21L, in line with Pointe du Lac leading lights,

Charts 1336, 1337.

and marking the position of the submerged pier of the old front leading light. On the south side of the curve, 2½ cables beyond light-buoy 21L, is moored black spar buoy 23L.

Light draught channel.—A channel for vessels of light draught, with an approximate depth of 15 feet (4m6), extends from abreast Port St. François, westward to red spar buoy 16L, 2½ cables southeastward of Point du Lac front range light. The channel is entered from eastward by passing northward of the 8-foot (2m4) bank situated in mid-stream, opposite Port St. François. A black and orange spar buoy marks the southern side of the entrance. The channel passes northward of Poulier Laforce, Batture au Fer, and Batture à Biron, and is marked on the northern side by five orange spar buoys. The use of this channel avoids the stronger current in the ship channel in this section.

Caution.—Danger area.—A firing danger area exists on both sides of the ship channel in Lake St. Peter. For limits *see* chart 1337.

Chart 1337.

Lake St. Peter.—The length of this lake may be considered to be 14 miles, southwest and northeast, by 6 miles in width. Across this naturally shallow expanse, a ship channel 15⅔ miles in length, has been dredged to a depth of 35 feet (10m7). The width at curves varies from 800 to 950 feet (243m8 to 289m5).

Radio towers *(Lat. 46° 17′ N., Long. 72° 47′ W.)*—Five miles westward of Pointe du Lac, and about one mile inland from the northwestern shore of the lake, are situated two sets of radio towers. These are very conspicuous. The alignment of the eastern five towers coincides with gaps in the spoil banks on either side of the channel.

On the northwest side of the lake, Rivière Yamachiche, Petite Rivière Yamachiche, Rivière du Loup, and Petite Rivière discharge. One mile from the mouth of Petite Rivière Yamachiche is the village of Yamachiche, with a church surmounted by a conspicuous dome. In 1951, the village had 875 inhabitants. Two and a quarter miles in a straight line from the mouth of Rivière du Loup is situated Louiseville, with a church having two prominent spires. The town had a population of 4,088 in 1951.

Leading lights.—For the use of vessels of light draught, a pair of *fixed green* leading lights is placed to lead from the ship channel, through a dredged cut which is buoyed, into Rivière du Loup. In 1948, the cut was almost completely filled in and the depth over the bar at the mouth of the river was only 2 feet (0m6).

Near the head of Lake St. Peter, on the southeast side, the St. Francis and Yamaska Rivers debouch. The dredged cuts in the St. Francis River have filled in and local knowledge is required to follow the best available depths in the natural channel. A depth of 6 feet (1m8) can be carried across the bar, beyond which 7 to 11 feet (2m1 to 3m4) will be found for a distance of 1½ miles up to Ile St. Joseph. There is excellent shelter for small vessels in this section of the river. A least depth of 4 feet (1m2) is available as far as the village of Notre-Dame-de-Pierreville, eastward of Ile St. Joseph, where there is a Government wharf, and limited quantities of provisions can be purchased.

Light-buoy.—A red light-buoy, showing a *flashing red* light, is moored close northward of Pointe des Ilets, the western entrance point of the St. Francis and Yamaska Rivers.

Chart 1337.

The village of St.-François-du-Lac, where there is a Government wharf, is situated on the southwestern side of the St. Francis River, 6 miles from the mouth. Pierreville is on the opposite shore, one-half mile farther up. The population of these two villages, in 1951, was 762 and 1,448, respectively. Both are connected with Sorel by the Canadian National Railways.

The entrance into the Yamaska River is shallow and should not be attempted without local knowledge. There is good anchorage for small vessels in 7 feet (2^m1), $4\frac{1}{2}$ cables southward of Pointe des Ilets.

Curve No. 3.—This curve has an extreme width of 900 feet (274^m3). (For buoys in this portion of the channel *see* page 28).

Yamachiche Bend.—Anchorage.—From Curve No. 3, the ship channel runs straight, $236\frac{1}{4}°$ for $5\frac{1}{4}$ miles, to a slight curve, known as Yamachiche Bend. Here, the channel is $3\frac{1}{2}$ cables wide and temporary anchorage is possible.

Buoys.—On the north side of the channel at Yamachiche Bend is moored red light-buoy 58L, showing a *flashing red* light; opposite it is moored black spar buoy 57L.

Between Curve No. 3 and Yamachiche Bend, on the southeast side of the channel, are moored three black light-buoys, 25L, 37L and 51L, exhibiting *flashing white* lights and distant, respectively, 0·45, 2·55 and 5·2 miles from light-buoy 21L; and on the northwestern side, red light-buoys 32L and 44L, showing *flashing red* lights, and distant, respectively, 1·5 and 3·65 miles from light-buoy 22L. In this reach are also 9 red spar buoys on the northwest and 13 black spar buoys on the southeastern side of the reach.

Curve No. 2.—From Yamachiche Bend, the channel inclines a little more northwestward for a distance of $3\frac{3}{4}$ miles to Curve No. 2. Here, for half a mile, the channel is about 800 feet (243^m8) wide.

Wreck.—A green can buoy, moored about 1,300 feet (396^m2) eastward of black light-buoy 69L, marks the wreck of the barge *Burma*.

Lights.—Downstream leading line.—The front light of the downstream leading line is situated about 158°, distant 4·36 miles from Louiseville church. It is shown at a height of 10 feet (3^m0) from a red, square, steel skeleton tower, standing on a concrete pier, and with a square wooden slatwork day beacon, painted orange, attached. The rear light of this leading line is situated 2,000 feet (609^m6), $249\frac{3}{4}°$ from the front light. At a height of 94 feet (28^m7), it is shown from a red, square, steel skeleton tower over a white building standing on a white, concrete pier. Both lights are *fixed white* and their alignment leads from Yamachiche Bend to Curve No. 2.

Upstream leading line.—The front light of this leading line is shown, at a height of 10 feet (3^m0), from a tower, similar to that from which the front light of the downstream leading line is shown, and standing on the same pier. The rear light, situated 2,000 feet (609^m6) 044° from the front light, is shown at the same height and from a similar tower as the rear light of the downstream leading line. Both lights are *fixed white* and their alignment leads from Curve No. 2 to the intersection with the alignment of Ile aux Raisins leading line.

Light-buoys.—On the southeast side of the channel, 0·48 mile below the front lights of Curve No. 2, is moored black light-buoy 79L, showing a *flashing*

Chart 1337.

white light. Midway between it and Yamachiche Bend are placed two similar buoys 69L, and one mile east-northeastward of it, 63L. On the same stretch are also seven red spar buoys and seven black spar buoys.

Curve No. 1.—From the middle of Curve No. 2 to the middle of Curve No. 1, the distance is 2·65 miles, the breadth of the latter being 800 feet (243^{m}8) at the widest part. On the northwest side of Curve No. 1 is moored red light-buoy 100L, showing a *flashing red* light. On the opposite side of the channel is black light-buoy 101L, showing a *flashing white* light.

Light and other buoys.—On the southern side of Curve No. 2, opposite the pier on which the front lights are located, is moored black light-buoy 81L. Between it and Curve No. 1 are placed black light-buoys 85L, 91L, and 97L, exhibiting *flashing white* lights. Besides these in the same reach are four black spar buoys and five red spar buoys.

Current.—Caution.—The rate of the current, always down, in the ship channel of Lake St. Peter, varies from one to 1·92 knots, and runs in the direction of the channel, excepting in Nicolet Traverse, at the northeastern part of the lake, where it sets east (or nearly two points different to the direction of the traverse), and should be allowed for.

Ile aux Raisins.—At the southwest end, or head, of Lake St. Peter, there is a group of low islands, 6 miles broad northwest and southeast, and 10 miles long. Those bordering the lake are named, commencing from the north, Ile à l'Aigle, Iles de la Girodeau, Ile de la Traverse, Ile Plate, and Ilets Percés (one of which is Ile aux Raisins); the ship channel passes immediately northwest of the last.

Weirs.—The following islands have been connected by stone weirs: Ile du Milieu, Ile Dorvilliers, Ile St. Ignace, Ile Ronde and Ile de Grâce. Southward of the ship channel, the flow between Ile des Barques and Ile du Moine is also blocked by a weir. The Chenal du Nord (Berthier Channel), Chenal aux Corbeaux, and Chenal du Moine remain open.

A new highway, with bridges over Chenal du Nord, Chenal du Castor, and Petit Chenal de L'Ile Dupas, now joins Berthierville with Ile St. Ignace, and affords connection with the ferry to Sorel.

Ile aux Raisins leading lights.—The front light, situated on Ile aux Raisins, is shown at a height of 37 feet (11^{m}3), from a red-roofed lantern on a white, square, wooden tower on a square, concrete pier with battered sides. The rear light, situated 1,992 feet (607^{m}1), 190¼° from the front light, is shown at a height of 84 feet (25^{m}6) from a white, octagonal, wooden lantern on a brown square, steel, skeleton tower, surmounted by a white, wooden watch-room. The lights are *fixed white* and in their alignment lead through the Ile aux Raisins dredged traverse from black light-buoy 103L to black light-buoy 111L.

Light and other buoys.—Five cables south-southwestward of black light-buoy 101L, is moored a similar buoy 103L showing a *flashing white* light. At the southwest end of the traverse is placed black light-buoy 111L, showing a *flashing white* light. Between the two latter buoys are three black spar buoys. Four red spar buoys mark the opposite side of Ile aux Raisins Traverse.

Anchorage.—There is roomy anchorage ground in 6½ fathoms (11^{m}9) with Ile aux Raisins front leading light, bearing about 165°, distant about three-quarters of a mile. The northerly extreme of this anchorage is marked by red spar buoy 112L.

Chart 1337.

Ile Lapierre, the low southwest extremity *(Lat. 46° 05′ N., Long. 73° 02′ W.)* of which is nearly $1\frac{3}{4}$ miles northeast of Ste. Anne de Sorel church, is a narrow low island $2\frac{3}{4}$ miles long, lying immediately northwestward of the ship channel. The flat extending from its northeast extremity is known as Batture de l'Ile Lapierre.

Light and other buoys.—The southeast side of this batture is marked by a red conical buoy, 116L, and red light-buoy 120L, which exhibits a *flashing red* light. Abreast of buoy 116L is moored black light-buoy 117L. On the south side of the track, near the anchorage, is moored black can buoy 113L.

Ile des Barques, low, and $1\frac{1}{2}$ miles in length, is situated southeast of Ile Lapierre, and northwestward of Ile du Moine, the ship channel passing between the two former. The current in this section of the channel attains a velocity of 2·8 knots.

Ile des Barques leading lights.—The front light, situated a third of a mile from the northeast extreme of Ile des Barques, is shown at an elevation of 38 feet (11^m6), from a red-roofed lantern on a white, square, wooden building standing on a concrete pier with battered sides, 24 feet (7^m3) in height. The rear light, situated nearly a third of a mile inside the west point of Ile du Moine, and 9,690 feet (2,953^{m}5), $218\frac{1}{2}°$ from the front light, is shown at a height of 102 feet (31^m1), from an octagonal, iron lantern on a brown, square, steel, skeleton tower with white, wooden slatwork on upper portion, and with a white wooden enclosed upper part. The tower stands on a whitewashed, square, concrete pier with battered sides, 19 feet (5^m8) high. The lights are *fixed white* and in their alignment lead from the Ile aux Raisins leading line to the Gallia Bay Upper leading line.

Gallia Bay *(Lat. 46° 05′ N., Long. 73° 01′ W.)* is the name given to a small indentation on the southeast side of the middle of Ile Lapierre and gives the name to the following pairs of leading lights on that island.

Gallia Bay Upper leading lights.—The front light, situated about the middle of the south side of Ile Lapierre, is shown at a height of 37 feet (11^m3), from a red-roofed lantern on a white, square, wooden building, standing on a square, concrete pier with battered sides. The rear light, situated 651 feet (198^m4), $248\frac{1}{4}°$ from the front light, is shown at an elevation of 73 feet (22^m3), from a red, square, wooden lantern on a white, cylindrical, steel tower, 5 feet (1^m5) in diameter, standing on a square, concrete pier with battered sides. The lights are *fixed white* and in their alignment lead from the Iles des Barques leading line to the Gallia Bay Lower leading line.

Gallia Bay Lower leading lights.—The front light, situated on the south side of Ile Lapierre, about one mile from its northeastern end, is shown at a height of 42 feet (12^m8) from a red-roofed lantern on a white, square, wooden building standing on a square, concrete pier with battered sides. The rear light, situated 600 feet (182^m9) 029°, from the front light, is shown at an elevation of 77 feet (23^m5), from a red, square, wooden lantern, on a white, cylindrical, steel tower, 5 feet (1^m5) in diameter, standing on a square, concrete pier with battered sides. The lights are *fixed white* and in their alignment lead from Gallia Bay Upper leading line to the Ste. Anne de Sorel leading line.

Light-buoys.—Black light-buoy 123L, showing a *flashing white* light, is moored on the southern side of the channel abreast the intersection of the Gallia Bay Upper and Lower leading lines. Red light-buoy, 126L, showing a

Chart 1338.

flashing red light, is moored on the northern side of the channel, one and a half cables westward from the intersection of the Gallia Bay Lower and Ste. Anne de Sorel leading lines.

Ile de Grâce, 10 to 15 feet (3^{m}0 to 4^{m}6) high is situated with its southwest side, three-quarters of a mile northwest of Ste. Anne de Sorel Village.

Chart 1338.

Ile de Grâce leading lights.—The front light, situated on the southern coast of Ile de Grâce, and three-quarters of a mile from its western end, is shown at a height of 42 feet (12^{m}8) from a white, square, iron lantern on a white, square building with sloping sides. The rear light, situated 1,968 feet (599^{m}8), 073¼° from the front light, is shown at a height of 73 feet (22^{m}3) from a red-roofed lantern on a square, steel, skeleton tower surmounted by a white, wooden, enclosed upper part. The lights are *fixed white* and in their alignment lead from Nepigon Shoal to near the west end of Ile St. Ignace.

Ile du Moine, previously alluded to, is situated close to the southern mainland, with its western end distant 1¾ miles below Ste. Anne de Sorel Village.

There is a narrow passage for light draught vessels between Ile du Moine and the southern mainland, Chenal du Moine, which leads into Chenal à Côté, and thence to the mouth of the Yamaska River. Another small channel leads from the lower end of Chenal du Moine, into the head of Lake St. Peter, passing westward of Ile aux Raisins. A channel dredged to a least depth of 6 feet (1^{m}8), in 1950, is maintained between Ile aux Fantômes and the south shore and between Ile Letourneau and the former island. A bridge connects the south shore to Ile aux Fantômes.

Ile du Moine leading lights.—The front light, situated near the western extremity of Ile du Moine, is shown at an elevation of 42 feet (12^{m}8) from a red-roofed lantern on a white, square wooden tower standing on a whitewashed, square, concrete pier, 25 feet (7^{m}6) high. The rear light, situated 1,590 feet (484^{m}6), 082½° from the front light, also serves as the rear light of the Ile des Barques' leading line. (*See* page 32). The lights are *fixed white* and in their alignment lead from Ste. Anne de Sorel leading line to abreast Nepigon Shoal.

Buoys.—A black can buoy, 129L, and a red conical buoy, 130L, mark the south and the north sides of the channel, respectively, opposite the southwestern entrance to Chenal aux Corbeaux.

Ste. Anne de Sorel *(Lat. 46° 03′ N., Long. 73° 04′ W.)* is situated on the south bank of the St. Lawrence River, three-quarters of a mile south of the southwestern extremity of Ile de Grâce; its church is also nearly 2 miles eastward from Sorel church. Ste. Anne de Sorel wharf basin is protected by two breakwaters; one is an extension of the wharf and this, with the other, forms a protected basin with a depth of 6 to 8 feet (1^{m}8 to 2^{m}4).

Ste. Anne de Sorel leading lights.—The front light, situated near the river, one-third of a mile northeastward of the village church, is shown at a height of 35 feet (10^{m}7) from a red, square, iron lantern on a white, square, wooden building, standing on a square, concrete pier. The rear light, situated 2,195 feet (669^{m}0), 235¼° from the front light, is shown at a height of 98 feet (29^{m}9) from a red-roofed lantern on a brown, square, steel, skeleton tower with white, wooden slatwork on the upper portion, and with a white, wooden, enclosed

Charts 1337, 1338.

upper part. The lights are *fixed green* and in their alignment lead south of Ile de Grâce, between the Ile du Moine and Gallia Bay Lower leading lines.

Light and other buoys.—A red light-buoy, 136L, showing a *flashing red* light, is moored on the north side of the channel, abreast the intersection of the Ile du Moine and Ste. Anne de Sorel leading lines. Marking the southern side of the channel, $5\frac{1}{3}$ cables westward of the intersection, is black spar buoy 139L; a similar buoy, 141L, marks the same side of the channel, $6\frac{1}{2}$ cables farther west.

Nepigon Shoal.—The second largest island of the group at the head of Lake St. Peter is named Ile St. Ignace. Extensive flats stretch southwestward from Ile de Grâce and Ile Ronde, to about $2\frac{1}{4}$ miles from the west extremity of Ile St. Ignace, and a mile below the mouth of Richelieu River. Here is situated Nepigon Shoal, with a depth of 20 feet (6^m1), in about the middle of the river, and on the north side of the ships' track, abreast the intersection of the Ile du Moine and Ile de Grâce leading lines.

Chart 1338.

Light-buoy.—Marking the northern side of the channel at this point is red light-buoy 146L, showing a *flashing red* light. This buoy also marks the western entrance of the dredged ship channel, 35 feet (10^m7) deep, extending to below the west end of Ile de Grâce.

Sorel.—This city, with a population of 14,961 in 1951, is situated on the south bank of the St. Lawrence River at the mouth of the Richelieu River. The village on the western side, with a population of 3,349 in 1951, is known as St. Joseph de Sorel.

The distance by the ship channel, from abreast the dome of the Ursulines convent at Trois Rivières to abreast the mouth of Richelieu River, is 31·90 miles; from abreast the Custom-house, Quebec, 99·50 miles; and from the north end of the Guard pier, Montreal, 38·8 miles.

Communication.—The city is served by the Canadian National Railways and therefore is in direct connection with all important points in Canada and the United States.

Government wharves.—Grain elevator.—Projecting northeast and east from the east entrance point of the Richelieu River is a wharf, known as Dock No. 1, the frontage on this river being 980 feet (298^m7) and that on the St. Lawrence River being 587 feet (178^m9). The depth alongside is 32 feet (9^m8). There are two main structures on this wharf, a grain elevator and an elevator extension, with a total capacity of 3,000,000 bushels. There are railway facilities in addition to water-mains, electric light and power. Dock No. 2, 561 feet (171^m0) long and 350 feet (106^m7) wide, projects from the shore, about a quarter of a mile east of the Richelieu River. There are depths of from 27 feet (8^m2) to 32 feet (9^m8) alongside. There are two freight sheds on Dock No. 2.

Lanctot Basin.—The above two wharves enclose Lanctot Basin, which provides a total berthing length of approximately 2,800 feet (853^m4), the available depth varying from 20 to 28 feet (6^m1 to 8^m5).

Reporting station.—There is a reporting station on the outer end of the eastern Government wharf.

Chart 1338.

Breakwater.—About 2½ cables southeastward of the reporting station is a breakwater, which extends in an easterly direction for about a cable, and then southwesterly for 96 feet (29m3). A depth of 6 feet (1m8) exists in the approach to and inside the breakwater. Spar buoys mark the channel leading inside the breakwater.

Wharves.—On the east side of the Richelieu River, the wharf of the Canada Steamship Lines, 320 feet (97m5) long, adjoins the elevator wharf. The depth alongside is 16 feet (4m9); there is a large shed on this wharf. Next southward are the following Government wharves: Morgan wharf, with a frontage of 137 feet (41m8) and depth alongside of 16 feet (4m9); the ferry docks here; Beaudet wharf, 102 feet (31m1) in length and depth alongside of 14 feet (4m3); Lavallée wharf, 310 feet (94m5) in length and depth alongside of 18 feet (5m5); Pontbriand wharf, 235 feet (71m6) in length and depth alongside of 12 feet (3m7). Other wharves on the east side of the Richelieu River are the Sincennes-McNaughton Ltd. and the F. P. Weaver Coal Co. All wharves are served by the Canadian National Railways.

Three-quarters of a mile above the mouth of the Richelieu River, at St. Joseph de Sorel, is the wharf of Quebec Iron and Titanium Corporation. It is about 500 feet (152m4) long, with a depth of 32 feet (9m8) alongside.

Lights.—A *fixed green* light is shown on the northwest corner and a *fixed red* light on the northeast corner of Dock No. 1.

Lanctot Basin leading lights.—The front light, on a pole 22 feet (6m7) high, is located on the south side of the basin, about 100 feet (30m5) back from the edge of the wharf. The rear light, 38 feet (11m6) high, is on the roof of the Depot storehouse, 249 feet (75m9), 167¼° from the front light. The lights, *fixed red*, lead into the basin between the two wharves forming the entrance.

Special rule of the road.—All vessels entering or leaving Sorel Harbour must keep to the port side, unless otherwise signalled.

Anchorage may be found off Sorel, north of the ships' track, in 5 to 8 fathoms (9m1 to 14m6), or indeed, anywhere on either side of the track between Sorel and Lanoraie.

Prohibited anchorage.—Anchorage is prohibited in the area south of the ship channel, off the mouth of the Richelieu River and the Government wharves.

Caution.—A submarine cable is laid across the Richelieu River in the vicinity of the charted ferry crossing.

Sorel Industries Ltd.—The site of the former Government shipyard on the western side of the Richelieu River, near its mouth, is now occupied by Sorel Industries Ltd. There is a wharf here with a depth of 18 feet (5m5) alongside. There is a stationary crane or shearlegs on the wharf for the hoisting out of boilers, machinery, etc., and one 30-ton travelling crane. The former has a hoisting power of 140 tons.

Bridges.—A highway lift bridge crosses the Richelieu River about 4 cables from the mouth; two cables farther up there is a railway swing bridge.

Shipbuilding.—On the west bank of the Richelieu River, immediately above the railway bridge, is the plant and shipyard of Marine Industries Ltd.

Repairs.—All necessary repairs to hulls, boilers, machinery and propellers can be made at Sorel.

Charts 1336, 1337.

Wintering.—Each season many vessels winter at Sorel, there being good berthing accommodation between the river mouth and the railway bridge.

Tugs and towage.—Sorel is the headquarters of the Sincennes-McNaughton Lines Ltd., and other tug operators.

Measured mile beacons.—Near the shore, and half a mile from the southwest extreme of Ile St. Ignace, stand two beacons, which in line mark the west end of a measured statute mile, on the line of the Ile de Grâce leading lights. The alignment of the Lanctot Basin leading lights marks the eastern terminus.

Directions, Trois Rivières to Sorel.—*(For directions, Quebec to Trois Rivières, see* page 20). To pass through the new South Channel, continue on Cap-de-la-Madeleine upper course, steering 217½°, until abreast the main channel of Rivière St. Maurice, passing light-buoys 49C and 50C. Haul gradually westward on to Ste. Angèle range, steering 228½°, to its intersection with Trois Rivières range, passing light-buoy 54C, spar buoy 56C, and light-buoys 57C and 61C. Bring the Trois Rivières range on, steering 203°, until the Shawinigan Water and Power Company's overhead cable is left astern, whence gradually haul westward, keeping in the middle of the river. When about a cable below light-buoy 65C, Port St. François wharf should be seen, distant about 2 miles and a course of 232½° should be steered to pass 200 yards (182^{m}9) northwest of it, and 380 yards (347^{m}5) off black light-buoy 65C. Continue on the same course, steering for Nicolet Traverse front lighthouse, until midway between black spar buoy 3L and red light-buoy 4L.

Now steer 244°, keeping the Port St. François leading lights in alignment astern, for a quarter of a mile, when haul gradually northward, passing 100 yards (91^{m}4) south of red conical buoy 6L, and red spar buoy 8L, for nearly a mile, when black light-buoy 9L, at the southeast entrance to Nicolet Traverse, should be reached. Now keep the Nicolet Traverse leading lights in alignment astern, steering 288° until past black light-buoy 13L, when haul very gradually southwestward for 1¼ miles, passing northward of black spar buoy 15L, between black light-buoy 17L and red spar buoy 16L, northward of black spar buoy 19L and between black light-buoy 21L and red light-buoy 22L.

Vessels desiring to use the light draught channel, (*see* page 29), should haul gradually northward, after passing black light-buoy 65C, in order to avoid the 8-foot (2^{m}4) bank in mid-stream abreast of Port St. François. The orange and black spar buoy, marking the southern side of the eastern entrance to this channel, is left to port. The remaining buoys, orange-coloured spars, are passed on the starboard hand; red spar buoys 8L, 10L, 12L and 14L are left to port. The ship channel is re-entered by passing southward of red spar buoy 16L.

Chart 1337.

Caution.—Current.—The down current in Nicolet Traverse sets east and not in the direction of the channel; this should be guarded against.

When a quarter of a mile above red light-buoy 22L, keep Pointe du Lac leading lights in alignment astern, steering 236°, 5·4 miles, between a series of black spar buoys and black light-buoys, 25L, 37L, and 51L on the port, and red spar buoys and red light-buoys 32L and 44L on the starboard hand (*see* page ..), until up to Yamachiche Bend. Here, in the wider channel, if the weather is thick, a vessel may anchor temporarily northwest of the track. If proceeding, the Curve No. 2 Downstream leading lights will be seen in alignment ahead, and should be steered for, 249¾° for about 3·4 miles, passing between several black spar buoys and black light-buoys 63L and 69L, on the port, and red spar buoys on the starboard hand.

Charts 1336, 1337.

When abreast black light-buoy 79L, a vessel should haul gradually southward for two-thirds of a mile, passing black light-buoy 81L, until black light-buoy 85L is abeam. The Curve No. 2 Upstream leading lights should now be kept in alignment astern, steering 224¾°, for about 2 miles, passing black light-buoy 91L, until up to black light-buoy 97L. Now haul gradually southward, passing southeast of red light-buoy 100L, and when abreast black light-buoy 103L, the Ile aux Raisins leading lights should be seen in alignment ahead. A course for them should now be steered, bearing 190¼° for about 2 miles, until abreast black light-buoy 111L. (*See paragraph headed "Caution" on page 31*).

The ship should now gradually alter course westward for half a mile, when Ile des Barques leading lights should be seen in alignment ahead, steering 218½°. If not requiring to anchor (*see* page 31), keep on this leading line for about 1¼ miles, passing 75 yards (68ᵐ6) northwest of black can buoys 113L and 117L and the same distance southeast of red conical buoy 116L.

When 300 yards (274ᵐ3) below red light-buoy 120L, haul very gradually westward for half a mile to bring Gallia Bay Upper leading lights into alignment ahead, bearing 248°. Steer for them so, for about three-quarters of a mile, until nearly up to black light-buoy 123L, at Pointe au Soldat (*see* page 32). Round this buoy at a distance of 120 yards (109ᵐ7) and bring the Gallia Bay lower leading lights into alignment astern, bearing 029°. Steer 209° on this leading line for about two-thirds of a mile, when Ste. Anne de Sorel leading lights will be seen in alignment ahead, bearing 235¼°. Proceed for them so about 1½ miles, passing between black can buoy 129L and red conical buoy 130L, until a quarter of a mile below red light-buoy 136L.

Chart 1338.

The course should be very gradually altered westward for half a mile, until Ile du Moine leading lights are in alignment astern, bearing 082½°. Steer now 262½° on this leading line for 1½ miles, until up to Nepigon Shoal red light-buoy 146L, passing northward of black spar buoys 139L and 141L. The alignment of Ile de Grâce leading lights should now be kept astern, steering 253¼° past the entrance to Richelieu River, if bound for Montreal. If wishing to enter Lanctot Basin, bring the leading lights within the basin, into alignment bearing 167¼° and proceed in.

CHAPTER III

RICHELIEU RIVER—SOREL TO LAKE CHAMPLAIN

The depths in the Richelieu River mentioned in this chapter, unless specifically referred to some other datum, refer to the datums of Canadian charts Nos. 1325 and 1326, which are as follows:—

St. Lawrence River and Sorel Harbour—the adjusted 1897 low water datum.

Above Sorel to St. Ours lock—12 feet (3^m7) on lower sill of St. Ours new lock.

St. Ours lock to Chambly Basin—$11\frac{1}{4}$feet (3^m4) on upper sill of St. Ours new lock, or $6\frac{1}{4}$ feet (1^m8) on lower sill of lock No. 1, Chambly Canal.

St. Jean to Lake Champlain—6 feet (1^m8) on upper sill lock No. 9, Chambly Canal.

Charts 1325, 1326, 1338.

Richelieu River, through the connection at its head, or southerly end, with Lake Champlain and the New York State barge canal system and the Hudson River in the United States territory, forms part of an international waterway for commerce between Canada and the United States.

The Richelieu flows in a general northerly direction $76\frac{1}{4}$ statute (66·3 nautical) miles from Old Rouses Point, just south of the International Boundary, emptying into the St. Lawrence River on the western side of the city of Sorel.

At its mouth, in Sorel Harbour, it is about 350 feet (106^m7) wide; its general width is from 1,500 to 4,500 feet (457^m2 to $1,371^m6$), with the exception of Chambly Basin, where it attains a maximum width of $1\frac{1}{4}$ miles. At Old Rouses Point, it is about 5,500 feet ($1,676^m4$) in width.

The depths in the channel range from 33 to 6 feet (10^m1 to 1^m8) at the datums of the charts. The maximum draught permissible for the whole route is limited to 6 feet 3 inches (1^m9), which is the available depth over the sills of the Chambly Canal locks. In periods of extreme low water, the permissible draught is less than this; the depth of water on the lower sill of St. Ours lock is governed by the level of the St. Lawrence River and has been as low as 4 feet 11 inches (1^m5) in 1895. The limiting depth from Sorel to St. Ours was reported in 1939, to be 7 feet (2^m1), when there is a depth of 12 feet (3^m7) on the lower sill of St. Ours new lock.

From the mouth at Sorel, there is a stretch of improved navigable water for $11\frac{1}{2}$ miles to St. Ours lock, which lifts a vessel over a difference of level of 5 feet (1^m5). From this point, a vessel may continue upstream for 27 miles to an expansion of the river at Chambly Basin, from whence for 11 statute miles the river becomes a series of rapids, with a difference of level of 74 feet (22^m6) between Chambly and St. Jean, necessitating the use of nine locks in the 12 statute miles stretch of the Chambly Canal.

From the upper end of the canal at St. Jean, there is an unobstructed reach of navigable water to the head of the river at Lake Champlain.

Communications.—Roads follow parallel to each shore of the river from Sorel to Lake Champlain, passing through Ste. Victoire, St. Ours, St. Roch, St. Denis, St. Antoine, St. Charles-River-Richelieu, St. Marc, Chambly, St.

Chart 1325.

Jean, and Iberville. Vehicles may cross the river by means of bridges at Sorel, Beloeil, Chambly, St. Jean and Iberville, and at Lacolle and by ferries at St. Ours, St. Denis, and St. Charles-River-Richelieu.

For railway facilities, see under names of localities on the Richelieu in the following pages.

Sorel to St. Ours lock.—From the mouth of the river at Sorel to a point one and a half miles upstream, abreast the Sheppard mill, the Richelieu has a depth of 25 feet (7m6) in the channel at low water datum of the chart. A half mile above the entrance is the highway lift bridge and 2 cables beyond is the swing bridge of the Canadian National Railways.

From the Sheppard mill to Ste. Victoire wharf, located on the east shore 6½ statute miles above Sorel, the river has an average width of 600 feet (182m9), flowing between steeply sloping banks of moderate height and the depths in the channel vary from 20 feet (6m1) in the lower portion to 7 feet (2m1) off Ste. Victoire wharf. The latter has a small landing shed on it. One mile below it on the west shore is a conspicuous ridge of sand-hills.

One and a quarter miles above Ste. Victoire wharf, on the same shore as the latter, the high bank is surmounted by a small sawmill with a round, iron stack, and 4 cables downstream from this point is a middle ground in the channel, with 5 feet (1m5) of water over it. This section of the river has been dredged to 7 feet (2m1).

Ile Deschaillons *(Lat. 45° 55′ N., Long. 73° 09′ W.)*, low and grassy, a mile and a quarter long, lies three statute miles above Ste. Victoire wharf. The main channel passes eastward of the island, the other being almost dry at low water.

Leading lights.—Ile Deschaillons leadings lights, *fixed white*, located on the east side of the river about a mile below that island, are shown from masts with white and black diamond-shaped daymarks. They lead through the channel below St. Onge Traverse.

St. Onge Traverse.—Shoal water extends for a short distance from the lower end of Ile Deschaillons, and also from the east bank of the river opposite, narrowing the channel at this point, known as St. Onge Traverse, to a width of about 200 feet (61m0) between the 6-foot (1m8) contour depths. Two leading lights, *fixed white*, located on the west bank about 2½ cables below the island, are shown from masts having black and white diamond-shaped targets. The alignment of these beacons leads through the St. Onge Traverse channel.

Buoys.—Between Sorel and St. Ours, the channel is buoyed with seventeen red spar buoys, ten black spar buoys and eight black light-buoys showing *flashing white* lights.

Cardinal Traverse.—At the upper end of Ile Deschaillons, in Cardinal Traverse, the channel again narrows to a width of 150 feet (45m7), with a depth of 9 feet (2m7) in the middle. Cardinal Traverse is marked by four red and one black spar buoy, and two black light-buoys showing *flashing white* lights.

St. Ours Town, with a population of 703 in 1951, is situated on a high bank of the east shore of the river, one mile above Cardinal Traverse leading lights. On the opposite bank, equally high, is the village of St. Roch de Richelieu. Each has a conspicuous high church steeple, that of St. Ours being the larger and more southerly of the two. There is a Government wharf on each side of the river. That at St. Ours has a face 187 feet (57m0) in length, with a

Chart 1325.

depth of 10 feet (3m0) alongside. At St. Roch, the wharf is 73 feet (22m3) in length, with a depth of 8½ feet (2m5) alongside. A cable ferry crosses the river at this point, for the accommodation of pedestrian and vehicular traffic.

Communication.—Two miles northwest from St. Roch is a station of the same name, on the line of the Canadian National Railways, with daily trains to Montreal and Sorel.

St. Ours lock.—One and a half miles above the Government wharf at St. Ours is a high narrow island, about 500 yards (457m2) in length, with a conspicuous grove of pine trees and a windmill, lying quite close to the east shore of the river. The west channel, formerly a rapid, is closed by a dam at the head of the island, and on the east side of the latter is located the St. Ours lift lock, which overcomes a difference of level in the river of 5 feet (1m5) at low water.

The lock has the following dimensions: available length, 311 feet (94m8), width 45 feet (13m7), and depth of water over the sills at low water is 12 feet (3m7).

Leading lights.—St. Roch Course.—Two *fixed white* lights located on the west side of the river, 1¼ miles above St. Roch Village, lead from the lower black light-buoy of Cardinal Traverse to the intersection of the alignment of St. Ours Lock Lower Traverse leading lights.

St. Ours Lock Lower Traverse *fixed white* leading lights, located on the west side of the river one mile above St. Roch Village, in one, astern, lead from the intersection of the alignment of St. Roch Course leading lights to St. Ours lock.

St. Ours Lock Upper Traverse *fixed green* leading lights, in one, astern, lead from St. Ours lock to the intersection of the alignment of Laperle Course leading lights. In 1950, the southern approach to St. Ours lock was dredged for a length of about one cable and a width of half a cable, to a depth of 10 feet (3m0).

Laperle Course *fixed white* leading lights, located on the west side of the river about 1½ miles above St. Ours lock, *(Lat. 45° 52′ N., Long. 73° 09′ W.)* lead from the intersection of St. Ours Lock Upper Traverse leading lights to the intersection of the alignment of Laplante Traverse leading lights.

Buoys.—These traverses are marked by spar buoys as follows:

St. Roch Course, four red and four black; St. Ours Lock Lower Traverse, three red and three black; St. Ours Lock Upper Traverse, three red and three black; Laperle Course, three red and three black.

St. Ours lock to **St. Denis-River-Richelieu.**—About 1½ cables upstream from Laperle lights, at a point where the river bends slightly to the westward, Laplante Creek enters the Richelieu from the east shore.

From Laplante Creek to the wharf at St. Denis-River-Richelieu, the distance is 3½ statute miles. About three-quarters of a mile below the latter village, the river widens to about 450 yards (411m5) and maintains this width for 2½ miles upstream. Shoal-water flats, with from 2 to 5 feet (0m6 to 1m5) over them, extend over this area from shore to shore and through them a narrow channel with 7 feet (2m1) has been improved.

Laplante Traverse *fixed white* leading lights, located on the east side of the river, 2 miles above St. Ours lock, lead from the intersection of the alignment of Laperle Course leading lights to Laplante Creek.

Chart 1325.

Buoys.—Laplante Traverse is marked by three red and three black spar buoys.

St. Denis-River-Richelieu, with a population of 822 in 1951, is situated on the east shore, $5\frac{3}{4}$ statute miles above St. Ours lock. It has an imposing Roman Catholic church with two spires. The Government wharf, 470 yards (429^{m}8) below the church, has a depth of 7 feet (2^{m}1) alongside.

In mid-river, opposite the church, is Petite Ile, 300 yards (274^{m}3) long by 100 yards (91^{m}4) wide, with a cottage and some scattered trees on it. Half a mile below Petite Ile is a smaller, low bare, flat islet, almost covered at the high level stage of the river.

St. Antoine *(Lat. 45° 47′ N., Long. 73° 10′ W.),* a smaller village on the west shore opposite St. Denis-River-Richelieu, extends for about a mile along the river front. It also has a large church with two spires, which are conspicuous for some miles both up and downstream. There is a Government wharf 600 yards (548^{m}6) above Petite Ile, with 7 feet (2^{m}1) alongside.

Two cable ferries cross the river, one below, the other above Petite Ile.

Communication.—A road runs direct, $7\frac{1}{2}$ miles northwest to Contrecœur on the St. Lawrence River, where there is a station of the Canadian National Railways, with daily trains to Montreal and Sorel.

Leading lights.—St. Antoine Course *fixed white* lights, located on the east side of the river, one mile above St. Denis-River-Richelieu, lead through the 10-foot (3^{m}0) channel from about a mile below the village to the intersection of the alignment of the Marcotte Traverse leading lights.

Two beacons with white diamond-shaped daymarks, lead through the 7-foot (2^{m}1) channel up to the Government wharf at St. Denis-River-Richelieu.

Marcotte Traverse *fixed white* leading lights, located about three-quarters of a mile above St. Antoine church, lead from the intersection of the alignment of the St. Antoine Course leading lights to the intersection of the alignment of the St. Antoine Traverse leading lights.

St. Antoine Upper Traverse *fixed white* leading lights, located about three-quarters of a mile above St. Antoine church, in one, astern, lead from the intersection of the alignment of Marcotte Traverse leading lights to about a mile upstream.

Buoys.—The channel through the flats is marked by one *flashing red* buoy, one *flashing white* buoy, twenty-two red and twenty-two black buoys.

St. Denis-River-Richelieu to Belœil.—From Marcotte Traverse lights to Belœil, 14 statute miles, the river depths range from about 25 to 7 feet (7^{m}6 to 2^{m}1).

St. Marc-St. Charles-River-Richelieu range lights.—About 3 miles above St. Antoine Upper Traverse lights, and on the same side of the river, *fixed green* lights lead through the channel to St. Charles-River-Richelieu.

Buoys.—Two red, *flashing red,* light-buoys, two black, *flashing white,* light-buoys, seven red spar and nine black spar buoys mark the above channel.

Rivière l'Amyot enters the Richelieu from the east shore about $5\frac{1}{2}$ statute miles above the church as St. Denis-River-Richelieu. The village of **St. Charles-River-Richelieu** is a little more than a mile farther upstream, on

Chart 1325.

the east shore, and three-quarters of a mile beyond it, on the opposite bank, is the little village of St. Marc. St. Marc church steeple is conspicuous, and in St. Charles-River-Richelieu is a large school surmounted by a belfry.

A cable ferry crosses the river just below the latter village.

Communication.—The nearest railway stations are at Verchères, near the St. Lawrence River on the line of the Canadian National Railways, 12 statute miles distant, with daily trains to Montreal and Sorel, and at Belœil on the same railway $7\frac{1}{2}$ miles upstream, with daily trains to Montreal and the eastern townships.

Middle Ground.—A bank, with one foot (0^m3) over it, nearly 600 yards (548^m6) long north and south, and 100 yards (91^m4) in breadth, and covered with weeds, lies in the middle of the stream, extending from abreast St. Charles-River-Richelieu wharf to nearly abreast the school.

Wharves.—Vary wharf *(Lat. 45° 42′ N., Long. 72° 12′ W.)* lies about one mile below the village of St. Marc, and has a face 90 feet (27^m4) in length, with a depth of 6 feet (1^m8) alongside. St. Marc wharf has a length of 59 feet (18^m0) at the face, and a depth of 5 feet (1^m5) alongside. Larue wharf, 3 miles below St. Marc Village, has a face 60 feet (18^m3) long with a depth of 10 feet (3^m0) alongside. In 1940, a basin 250 feet (76^m2) in length was dredged in front of this wharf to a depth of 9 feet (2^m7). At St. Charles-River-Richelieu is a wharf, with a face 144 feet (43^m9) long and a depth of 7 feet (2^m1) along the face.

Ile de Jeannotte and **Ile aux Cerfs** are two islands lying about $1\frac{3}{4}$ statute miles above St. Marc church, in an expansion of the river, where the stream attains a width of 4 cables. Ile aux Cerfs, the southernmost is the larger of the two, 730 yards (667^m5) long in the direction of the stream and about 400 yards (365^m8) in breadth. It is fairly high, heavily wooded, and has some dwellings near its southern end. Ile de Jeannotte is about 700 yards (640^m1) long and 270 yards (246^m8) broad.

Abreast the latter island, and on the west shore of the river, is a deep-water wharf, and a short distance back from it is a small grist mill, surmounted by a square water tower and windmill. Five hundred yards (457^m2) above the wharf, where the river bends to the eastward, is the mouth of a small stream, Premier Grand Ruisseau.

Ile aux Cerfs leading lights, located on the west bank of the river abreast the island of that name, mark the channel from a short distance above St. Marc Village to the mouth of Premier Grand Ruisseau; these lights are *fixed white.*

Buoys.—Ile aux Cerfs Course is marked by ten red and ten black spar buoys, and one red light-buoy, showing a *flashing red* light, and one black light-buoy, showing a *flashing white* light.

The main channel by Ile de Jeannotte and Ile auv Cerfs is to the westward of the islands and close to the main shore of the river. It has been dredged to 10 feet (3^m0). The passage eastward of the islands contains boulders and weeds, with only 2 and 3 feet (0^m6 and 0^m9) of water.

From the upper end of Ile aux Cerfs, the Richelieu resumes its southerly direction in a gradual curve, and for the remaining $4\frac{1}{2}$ miles to Belœil maintains an almost constant width of 230 yards (210^m3). In this portion of the river, the water is deep close up to either shore, with from 15 to 20 feet (4^m6 to 6^m1) in mid-channel.

Chart 1325.

A submarine cable crosses the river about one-quarter of a mile below the bridge.

Belœil and **St. Hilaire** are situated 5¼ statute miles from Ile aux Cerfs, the former on the west shore, the other directly opposite. Belœil had a population of 2,493 in 1951, and St. Hilaire 1,436. Each has a prominent Roman Catholic church, directly opposite each other, and their steeples are visible for several miles down the river. Both communities are popular summer resorts, and many pretty villas line the river banks, from the neighbourhood of the churches upstream to Belœil railway bridge.

Bridges.—Less than one-half mile above Belœil and St. Hilaire, a highway bridge crosses the river. The swing span, located in the middle of the bridge, has a clear opening of 100 feet (30^{m}5) on each side of the pivot pier. When the span is closed there is a clearance of 30 feet (9^{m}1), at summer elevation of the river, midway between the piers.

The Canadian National Railways bridge crosses the Richelieu about 1½ miles above the town of Belœil. Belœil Station is located near the west end of the bridge. St. Hilaire Station is situated one-quarter of a mile from the east shore, halfway between the bridge and the village, and another station is located back of the village, a quarter of a mile from St. Hilaire church.

There are several small private wharves, for the use of motor-boats, on the St. Hilaire shore, a half-mile above the church. At Belœil is a wharf with a face 100 feet (30^{m}5) in length and along the face is a depth of 6 feet (1^{m}8). Belœil Station Government wharf has a face 72 feet (21^{m}9) long, with a pilework structure immediately above the wharf 101 feet (30^{m}8) in length; along the face of the wharf is a depth of 7 feet (2^{m}1).

From the highway bridge to a quarter of a mile above the railway bridge, a shoal-water bank makes out from the east shore, gradually extending farther across the river, until at the latter bridge it leaves only a very narrow channel, close to the west shore, 150 feet (45^{m}7) in width. There is from one to 6 feet (0^{m}3 to 1^{m}8) on this bank, and 7 and 8 feet (2^{m}2 and 2^{m}4) in the channel.

The channel lies between the west shore and the first pier of the bridge, or under the draw span, which is opened for vessels on a signal from the latter. This channel has been improved and is protected by a concrete embankment along the west shore, and has four guide piers in line extending upstream from the bridge pier for a distance of about 200 yards (182^{m}9), the guide piers being connected by booms.

Light.—On the upstream, or most southerly one of the guide piers is shown a *flashing white* light. The light is erected on a mast, which has a small white shed at its base.

Buoys.—The channel immediately below the railway bridge is indicated by three red and four black spar buoys. Two black spar buoys, moored three-quarters of a mile above this bridge, mark a small shoal in midstream, and about 2 miles from the railway bridge, upstream, a red and a black spar buoy mark the position of a pipe line and shoal.

Mount St. Hilaire *(Lat. 45° 33′ N., Long. 73° 10′ W.)*, with several summits, the highest being 1,300 feet (396^{m}2) above mean sea-level, rises abruptly from the surrounding plain about 2 miles southeast from St. Hilaire Village. It is heavily wooded, but with rugged outcroppings of rock showing at the summits. It constitutes the most prominent natural feature of the whole Richelieu Valley, and is visible from the river for many miles up and down stream. From its

Chart 1325.

summit, on a clear day, a long stretch of the St. Lawrence River may be seen, from below Sorel to above Montreal, whilst to the southward a view of the Richelieu may be had for some distance beyond St. Jean.

About 5 miles to the westward of Belœil is Mount Bruno, of lesser elevation, and not so conspicuous from the river.

Chart 1326.

Belœil to Chambly.—At the railway bridge, 1½ miles above Belœil, the Richelieu bends sharply to the westward for one mile and then resumes its general trend south-southwestward for 4 miles to the foot of Chambly Basin. One mile above the bridge, and on the west shore, is located an extensive plant for the manufacture of explosives. Its two chimneys are conspicuous from upstream and there is a small deepwater wharf where barges unload their cargoes. The channel off this wharf has been dredged to 12 feet (3m7) (1950). The best channel from the railway bridge to this point is close to the west bank in 11 feet (3m4) of water. One mile above the explosive works, the water shoals to 6 and 8 feet (1m8 and 2m4), but beyond that point the general depth varies between 13 and 20 feet (4m0 and 6m1).

Chambly Basin, 1½ miles long, north and south, and 1¼ miles in width, is a lake-like expansion of the Richelieu at the foot of Chambly Rapids. It is for the most part shoal, 6 or 7 feet (1m8 or 2m1) deep, navigation being confined to a well defined, improved channel leading to the entrance of the Chambly Canal.

St. Mathias *(Lat. 45° 28′N., Long. 73° 16′ W.)*, a small village with a prominent church spire, on the east shore at the north end of Chambly Basin, has a Government wharf, 93 feet (28m3) in length, with 9 feet (2m7) of water alongside. Half a mile below the wharf, and on the opposite shore is the mouth of Rivière L'Acadie, a shallow stream, with several passages, dry in summer, that penetrate the northwest shore of the basin, and subdivide the latter into a group of four islands. The largest, directly opposite St. Mathias wharf, is Grand Ile.

A half a mile south of St. Mathias wharf, and almost joined to the main east shore of the basin, lie a small group of low, grassy islands, covered by flood waters in the spring. About a quarter of a mile south of these is the mouth of a small, shallow stream, Rivière des Hurons. Off this shore, for a quarter of a mile, there is only one to 3 feet (0m3 to 0m9) of water.

The village of Chambly is situated on the southwest shore to the westward of the canal entrance. It had a population of 2,160 in 1951; contains an hotel, several stores, and the main office of the Chambly Canal. A Roman Catholic church with a high belfry and spire stands prominently on the high west bank of the basin, near the western end of the town.

Chambly Canton, with a population of 1,636 in 1951, is another village on the south shore of the basin, extending from the east side of the canal locks for a mile and a quarter up the river. At the water's edge, a short distance east of the canal entrance and close by the foot of the rapids, are the ruins of Fort Chambly, its massive stone walls towering 40 feet (12m2) above the river. Immediately east of it, on top of the bank, are the stone buildings of the cantonment.

Chart 1326.

Richelieu Village lies on the east shore of the river, opposite the south end of Chambly Canton and one mile upstream from the basin. It had a population of 1,121 in 1951. It has a Roman Catholic church with an imposing steeple, and a highway bridge crosses the river here, connecting the two villages. The Central Vermont Railway bridge spans the river a short distance above the other. Half a mile below these, at the head of the rapids, a dam reaches across the stream, with a power-house located on the Richelieu Village side.

Wharves.—From the east side of the canal entrance, a concrete guide pier extends for about 500 feet (152^{m}4) into the basin, and vessels may lie at its west side where there is a depth of 7 feet (2^{m}1), or for a short distance in alongside the east side.

A short distance west of the entrance, at the rear of the hotel, is the remains of a small landing wharf with 5 or 6 feet (1^{m}5 or 1^{m}8) of water at its head.

Sheltered wharfage is to be had in the canal basin, above the first flight of locks, alongside a concrete embankment wall, where coal barges and others unload their cargoes.

Communication.—Railway communication is had with Montreal and the Eastern Townships and the United States by the Central Vermont Railway, which has stations at all three of this group of villages. Also, from Chambly there is an electric railway line and autobus service to Montreal.

Lights.—On the outer end of the guide pier is a small electric light, showing a *fixed red* light, and a similar one on the bridge at the top of the locks.

Buoys.—Chambly Canton and Chambly Basin Channels are marked by four red and seven black spar buoys, and five red buoys showing *flashing red* lights, and one black buoy, showing a *flashing white* light.

Chambly Canal.—From Chambly Basin, for 11 statute miles upstream to the town of St. Jean, the difference of elevation of the river is 74 feet (22^{m}6), and quite unnavigable. Three miles above the basin is a second dam; a mile above the latter are Fryers Rapids; and in the three-mile stretch below St. Jean are located the Les Mille Roches Rapids, and Rapides de St. Jean.

The canal is 11·78 statute miles in length, with 9 locks, 8 of which are located within a mile and a half of the lower end, and the ninth at St. Jean. The recommended draught through the canal is 6 feet 3 inches (1^{m}9).

Lock dimensions.—Locks Nos. 1 to 8 are from 23¼ to 24⅓ feet (7^{m}1 to 7^{m}4) wide, the length varying from 120½ to 126 feet (36^{m}7 to 38^{m}4). The guard lock, No. 9, at St. Jean, is 23 feet 7 inches (7^{m}1) wide and 120 feet 7 inches (36^{m}7) long. The lock of the minimum usable length is No. 2, with an inside clearance of 111 feet 5 inches (33^{m}9). Depth of water on the sills is 6½ feet (1^{m}9) and minimum overhead clearance is 120 feet (36^{m}6) (telephone wires).

The canal commences at the guide pier on the south shore of Chambly Basin and leads southeasterly for about a mile and a quarter along the southerly outskirts of Chambly Canton to the crossing of the Central Vermont Railway. On this stretch are located the first of three locks, Nos. 1, 2 and 3, which lift a vessel up into the harbour basin in the town, and locks Nos. 4, 5, 6, and 7, south of the village, with lock No. 8 about 150 yards (137^{m}2) above the railway bridge.

From this point upward, the canal follows the west bank of the river closely. In the river, 5 miles above Chambly, is Ile Ste. Thérèse, 2½ statute miles long, and here the canal broadens to a width of about 150 yards (137^{m}2) into what was

Chart 1326.

originally the west channel of the river. The best water in this expansion is closer to the east bank, and at the upper end of the island, where the canal again narrows to an artificial cut. The water along the west side of the basin is very shallow and contains sunken logs and other dangers. A tow path follows the east bank of the canal. The main office is located at Chambly Basin.

Traffic.—During the year ended December 31, 1951, a total of 719 vessels passed through the canal with a total tonnage of 98,134. Of these, 698 vessels were Canadian.

St. Jean to Lake Champlain.—The city of **St. Jean** *(Lat. 45° 27′ N., Long. 73° 17′ W.)* situated at the head of Chambly Canal, on the west shore, 53½ statute miles from Sorel, had in 1951, a population of 19,282. Directly opposite St. Jean is the town of Iberville, with a population in the same year of 5,185. Three bridges span the canal and river between the towns. The lower one, that of the Canadian Pacific Railway, has a swing span over the canal; the middle one is the highway bridge, with a bascule span; and the upper one, at the south end of St. Jean, is crossed by the Central Vermont Railway and has a swing span over the canal entrance.

St. Jean and Iberville Roman Catholic churches, each with an imposing high spire, are most conspicuous; these two, and a high, black, water tower in St. Jean, and several high factory stacks being visible up and downstream and for many miles from the surrounding flat country.

Wharves.—In the canal entrance, which extends from the Central Vermont bridge north for half a mile to the Canadian Pacific Railway bridge, with a width at the upper end of 100 yards (91^{m}4) and narrowing to 40 yards (36^{m}6) at the lower, there is wharfage accommodation for many vessels, with depths of 7 to 8 feet (2^{m}1 to 2^{m}4). Steamers and barges unload at the concrete quay at St. Jean, which forms the west side of the canal entrance, between the Central Vermont and highway bridges.

The St. Jean Yacht Club, located 200 yards (182^{m}9) above the Central Vermont Railway bridge, has a breakwater and landing extending about 250 feet (76^{m}2) out into the river, and behind it small craft may find shelter.

The Iberville shore is shallow and the waterfront there has accommodation for only light draught vessels. However, the Government wharf, immediately above the bascule bridge, is 107 feet (32^{m}6) long and 40 feet (12^{m}2) wide, with a depth of 7 feet (2^{m}1) at the face.

Just south of the town are a barracks and training school of the Canadian Army.

Railway communications.—St. Jean is a station on the following railways: Canadian National, Canadian Pacific, and Central Vermont.

Light.—On the upper end of the guide pier about 500 feet (152^{m}4) south of the swing span of the Central Vermont Railway bridge, a *flashing green* light is shown from a white, square, wooden tower, surmounted by a red-roofed lantern, 23 feet (7^{m}0) high. The light marks the east side of the entrance to the canal and guides downbound vessels to the opening of the swing span.

Mount Johnson, 6 miles to the northeastward of St. Jean, is an isolated cone-shaped hill, rising about 700 feet (213^{m}4) above the surrounding level country. It is conspicuous for many miles from all directions.

Chart 1326.

St. Jean to Lake Champlain.—The distance from the head of the canal at St. Jean to Lake Champlain at Old Rouses Point, three-quarters of a mile south of the International Boundary, is 22½ statute miles. For 12 statute miles above St. Jean, to Ile aux Noix, the direction of the river upstream is almost true south. It maintains a general width of 300 yards (274m3) for half of this latter distance, to Pointe à la Meule, flowing between low, marshy banks partly wooded to the water's edge, and with no shoals and an average depth of 21 feet (6m4). On this stretch, about half-way between St. Jean and Pointe à la Meule, are a few cottages on the west bank with two small private landing stages.

Leading lights.—Pointe à la Meule *(Lat. 45° 14′ N., Long. 73° 15′ W.)*, a rounded curve of the low west bank, where the heavy woods terminate, 5 statute miles above St. Jean, is distinguished from the southward by its two leading lights. At this point, the river broadens to an expansion three-quarters of a mile wide and about 6 miles long; the water for the most part is quite shoal.

The rear light, about 200 yards (182m9) back from the west shore, is exhibited from a red, steel, skeleton tower with a white, enclosed upper part, at a height of 58 feet (17m6). The front light, 1,430 feet (435m9) south of the rear light, is exhibited from a white, square, steel, skeleton tower at a height of 23 feet (7m0), situated at the water's edge.

Both lights are *fixed white*, and in line, bearing 003½°, lead through the middle of the channel over the flats to the upper end of the river expansion near Ile aux Noix.

Buoys.—The channel indicated by the Pointe à la Meule leading lights is also marked by thirteen red and four black spar buoys. Of these, one black spar is moored off Halfway Point, and four red and four black spars are placed near the southern end of this leading line.

Ryan wharf, with a shed surmounted by a small cupola, projects from the east shore, slightly more than 2 statute miles above the front light. It has 6 or 7 feet (1m8 or 2m1) of water at its outer end, and a road leads from it 1¼ miles northeastward back to Sabrevois church, whose spire may be seen through the trees of the east shore.

On the west side, opposite, lies a ruined ferry landing in shoal water, with a road leading northwestward 1¾ miles to St. Blaise church, the latter visible across the open country of the west shore.

Pointe à la Meule Flats is the name given to the shoal water extending across the river about 1½ miles above Ryan wharf, with depths of 6 feet (1m8).

Ile aux Noix.—At this point, the river is divided into two channels for a distance of nearly 2 miles, whence it takes a southwesterly direction for 5 statute miles to Hospital Island, where it resumes its general south-southwest trend to Lake Champlain.

Ile aux Noix is nearly one statute mile in length and a quarter of a mile broad, with four marshy, wooded islets extending in a line northeastward from its lower end on a weed-infested bank, almost dry at extreme low stages of the river. Near the south end of the island stand the grass covered ruins of old Fort Lennox, its interior buildings being hidden by surrounding earthworks. A cable's length above the upper end of the island is a marshy islet known as Ile Ronde.

Ile aux Noix leading lights.—On the east side of the river, opposite Ile aux Noix, the front light is shown at a height of 16 feet (4m9), from a white, square, slatwork daymark, with a 2-foot (0m6) black stripe down the middle,

Chart 1326.

on a small shed. The rear light is shown at a height of 36 feet (11m0), from a similar structure located 1,098 feet (334m7), 174½° from the front light. The lights are *fixed white* and in line, lead from their intersection with the Pointe à la Meule leading line, into the eastern channel.

Buoys.—This section of the channel is marked by ten red and ten black spar buoys. Another black spar is moored abreast the lower leading light, at the turn in the channel.

The west channel past Ile aux Noix is narrow and winding and has about 14 feet (4m3) of water, except at its southern end between Ile Ronde and the point of the main shore known as Sturgeon Point. Here, there is only about 5 feet (1m5) across the weedy bank to the main channel.

On the west side of the river, at the village of Ile aux Noix, is a Government wharf with a depth of 8 feet (2m4) along the face, 60 feet (18m3) in length. An hotel and windmill stand close by, and a road leads for a quarter of a mile back to Ile aux Noix church, whose spire may be seen from Pointe à la Meule. Three statute miles west from the wharf may be seen another prominent church spire, that of St. Valentin, at Stottsville station on the Canadian National Railways from St. Jean to Rouses Point.

Light.—A *fixed white* light is exhibited at an elevation of 20 feet (6m0) from a pole situated at the northwest corner of the Government wharf at Ile aux Noix.

Hospital Island *(Lat. 45° 05′ N., Long. 73° 19′ W.)*—From Ile aux Noix for 3½ statute miles to Hospital Island, the river is about 500 yards (457m2) wide, with shoal water along either shore. There are a few scattered summer residences along the west bank. The depths in the channel vary 7 to 11 feet (2m1 to 3m4).

Hospital Island lies in the middle of the river and is about 275 yards (251m4) long and partly wooded. It is situated on a very shoal weedy bank that extends from it for half a mile below and above the island. The main channel is west of it. The passage on the east side, though having deep water alongside the island, is closed at both ends where the shoal water of the middle bank joins that extending from the east shore of the river.

Buoys.—The channel from Sturgeon Point southward to Ash Island is marked by eleven red spar buoys, two black spar buoys, three red light-buoys showing *flashing red* lights, and three black light-buoys, showing *flashing white* lights.

Lacolle bridge.—Ash Island.—Half a mile above Hospital Island lies the much larger Ash Island, one statute mile in length and 600 yards (548m6) in breadth. The navigable channel is between this island and the west shore; the narrow passage east of the island is almost dry at low stages of the river. Two bridges, a quarter of a mile apart, and each having a swing span in the middle, extend from the west shore to the island. The northern one is the highway bridge, the other being the Canadian National Railways crossing from Lacolle Junction, situated about one mile west from the river.

Wharf.—On the downstream side of the highway bridge, near the Ash Island shore, is a wharf with a face 102 feet (31m1) in length and depth alongside of 20 feet (6m1).

Immediately north of the highway bridge is the mouth of Lacolle River, a small stream entering through a grassy flat of the west shore.

Chart 1326.

Lights.—Located on top of the railway bridge, over the centre of the pier, is a *fixed* light, showing *white* when the swing is open and *red* when it is closed.

On each of the four guide piers, also, is shown a small *white* light.

Above Ash Island, the river gradually broadens to a maximum width of one statute mile, and maintains this width for 4 statute miles to its head at Lake Champlain.

Light.—On the southwest shore of Ash Island, about 200 yards (182^{m}9) above the railway bridge, a *fixed white* light is shown from a red, square, steel skeleton tower, with a white, wooden enclosed upper part. The light is 44 feet (13^{m}4) high and is visible from upstream only.

From this end of the island, a stony bank, with from one to 5 feet (0^{m}3 to 1^{m}5) over it, extends for one and a quarter miles upstream in the middle of the river.

Buoy.—The west edge of this bank is steep-to, and is marked by a black spar buoy, moored about 560 yards (512^{m}8) south-southwestward from the light. The opposite side of the channel is marked by a red spar buoy about 470 yards (429^{m}8) farther southwestward.

Caution.—Tugboats downbound with a tow of barges should give this bank a wide berth, as in attempting to make the bridge span at slow speed, the after end of the tow may be set by the current towards the island, and become grounded in shoal water.

To assist in taking tow barges through the bridge, a boom is usually strung from the upper end of the east guide pier, for some distance along the edge of the bank.

Light.—Bloody Island *(Lat. 45° 03′ N., Long. 73° 20′ W.)*, nearly one statute mile above Ash Island light, is a small stony lump on the west edge of the Ash Island shoal. It lies 300 yards (274^{m}3) from the west shore of the river, and on a black pier is erected a small, white, square, wooden tower, from which is exhibited a *fixed white* light at a height of 12 feet (3^{m}7). The channel is between this light and the west shore of the river.

The above light with Ash Island light in one, astern, leads from a short distance below Bloody Island to the intersection of the alignment of the Montgomery leading lights.

Buoys.—The Ash Island—Bloody Island Course is marked by two black and five red spar buoys. The most southerly pair of buoys mark the intersection referred to above.

Fort Montgomery *(Lat. 45° 00′ N., Long. 73° 21′ W.)*, in United States territory a quarter of a mile south of the boundary, is a huge, high masonry structure, rising from the water a quarter of a mile off the west shore and joined to the latter by a causeway over marshy flats. Two hundred yards (182^{m}9) off the walls of the fort is a depth of 10 feet (3^{m}0).

Montgomery leading lights are located on the west bank of the river, half a mile above Bloody Island. They are *fixed white* and are shown from poles with white, diamond-shaped daymarks, with a black vertical stripe. These lights in one, astern, lead from the intersection of the alignment of the Ash Island-Bloody Island leading lights into Lake Champlain.

Chart 1326.

Old Rouses Point is a low, marshy point of the west shore, half a mile south of the fort, and marks the head of the Richelieu River at its junction with Lake Champlain.

About three-quarters of a mile south of the fort is a long trestle bridge, with a swing span in the middle, crossed by the Rutland Railway.

Light.—Windmill Point, projecting from the east shore of Lake Champlain, opposite the town of Rouses Point, has a dark blue conical tower, from which is shown a *fixed white* light, at an elevation of 80 feet (24^{m}4).

This is the first United States light south of the International Boundary.

Lake Champlain, with all but a very small portion of its area in United States territory, extends southerly for a total length of about 96 miles (111 statute miles) from the International Boundary to Whitehall, where it connects with the Champlain branch of the New York State barge canal system. The broad lake proper is 71 statute miles in length, from the boundary to Crown Point, the remaining portion, known as The Narrows, 38 miles in length, being only 300 to 1,200 feet (91^{m}4 to 365^{m}8) wide and traversed by a narrow channel through marshy flats. This channel has been improved to a general width of 200 feet (61^{m}0) and a depth of 12 feet (3^{m}7) at low lake level.

The principal ports on the lake and their distances from the head of the Richelieu are Rouses Point, 2 statute miles, Plattsburg, 27 statute miles, Burlington, 42 statute miles, Port Henry, 70 statute miles, and Whitehall, 111 statute miles.

Prominent points and shoals throughout the lake are marked by lights and buoys, as shown by the United States charts and list of lights. At Plattsburg and Burlington, breakwaters afford shelter to vessels in port, and provision has been made for terminal docks and shipping facilities at the other ports.

From Whitehall, the Champlain barge canal, partly formed by the canalization of the Hudson River, and with 11 docks, extends for 61 miles to Troy, N.Y., where it is joined by the Erie canal system, the latter extending through the State of New York 341 miles and with 35 locks, to its western terminus at Tonawanda on the Niagara River, and by another branch canal with 7 locks to the port of Oswego, on Lake Ontario.

From Troy, or Waterford, the 155 mile stretch of the Hudson River is navigable for vessels not exceeding a draught of 12 feet (3^{m}7) to New York harbour on the Atlantic Coast.

Thus, a vessel of the above draught can be navigated from the head of the Richelieu River, by way of Lake Champlain and the New York State barge canals, the total distance of about 325 statute miles to New York and the Atlantic seaboard, or for about 515 miles to a port near the east end of Lake Erie, or to Lake Ontario.

The general dimensions of the locks in this system are, length 300 feet (91^{m}4), width 43½ feet (13^{m}2), with a depth of 12 feet (3^{m}7), over the mitre sills. The bridges over these routes are for the most part fixed structures, with a clearance of 15½ feet (4^{m}7) above the maximum navigable elevation of the water surface. In general, there are no towing paths and consequently tugs or power boats are required for navigation. The waterway is free, no tolls being charged.

Charts 1325, 1326, 1338.

Directions, Sorel to Lake Champlain.—With the aid of the foregoing description of the channel, lights, leading lines and buoys, and the use of charts Nos. 1325 and 1326, very little difficulty should be experienced in taking a vessel, drawing not over 6 feet (1m8) of water, from Sorel to Lake Champlain.

For nearly the whole distance, and except in sections of the channel previously described, a mid-channel course may be followed, care being taken to adhere to the line of the various leading lights and beacons, and, in proceeding south or upstream, red buoys being kept on the starboard and black buoys on the port hand.

Extra care should also be taken in navigating the narrow channels in the bends of the river, both below and above Ile Deschaillons, on the line of the St. Onge leading lights and through the buoyed Cardinal Traverse; in approaching and leaving St. Ours lock, where currents may tend to set a vessel off the line of the lights; in rounding Ile de Jeannotte and Ile aux Cerfs, above St. Charles; and, in approaching Belœil bridge, where the best water will be found close to the west shore. In entering the passage through this bridge, which caution applies also to the bridges at St. Jean and Lacolle, one should steer carefully to guard against the effect of the downward current.

Above Belœil bridge, keep closer to the west bank until near the explosive works, to avoid a 4-foot (1m2) spot, which lies in midstream, about 6 cables above the bridge, marked by two black spar buoys.

When in mid-channel, abreast of Sturgeon Point (above Ile aux Noix), do not haul too sharply westward to round the point for fear of fouling on the tail end of the shoal that extends from the west shore just above the point, but steer towards Hillman Point on the east shore, until abreast of the first red light-buoy. Then haul up for the next red light-buoy, seen a short distance farther south.

In approaching the bend, just below Hospital Island, proceed cautiously through the buoyed channel; alter course to port at the uppermost black light-buoy, and head for the east end of Lacolle bridge, until Hospital Island is abeam. Then follow the channel as indicatd by the spar buoys.

On leaving Lacolle railway bridge, steer for Bloody Island lighthouse for one-half mile, then, altering course a little to the westward, pass about midway between the lighthouse and the west shore of the river. When past the black spar, marking the upper end of the Bloody Island shoal, bring this light over the stern and in alignment with Ash Island high light. This course will lead to the intersection of the Montgomery leading lights, which latter alignment may be followed into Lake Champlain.

CHAPTER IV

SOREL TO MONTREAL

Chart 1338.

Alençon.—There are two Government wharves at the scattered village of Alençon, opposite Sorel, on Ile St. Ignace. The eastern one, 160 feet (48^{m}8) in length, has a depth of 16 feet (4^{m}9) at the face. Pile clusters for the use of the ferry, which usually docks on the lower side of the wharf, extend about 190 feet (57^{m}9) downstream from it. The upper wharf, about 2 cables farther west, is in ruins.

From the village, the south coast of Ile St. Ignace, 25 feet (7^{m}6) high, trends west-southwesterly three-quarters of a mile to its western extremity, depths under 30 feet (9^{m}1) being found a quarter of a mile off.

Cable area.—Submerged cables cross the river from the vicinity of the upper end of the ferry wharf at Alençon to Pointe-aux-Pins at St. Joseph-de-Sorel.

Transmission lines.—Two overhead transmission lines cross the St. Lawrence River, two-thirds of a mile above the mouth of the Richelieu River. They are supported by steel towers, the span between them being 3,950 feet (1,204^{m}9). The minimum clearance at high water is 166 feet (50^{m}6).

Radio mast.—About 8 cables west-southwestward of St. Joseph de Sorel church, and 1,000 feet (304^{m}8) back from the river bank, stands a conspicuous radio mast, 234 feet (71^{m}3) in height.

Ile aux Foins, a mile in length, southwest and northeast, is the upper island of the group at the head of Lake St. Peter. It is separated from the northwest shore of the St. Lawrence River by a passage 200 yards (182^{m}9) broad, with good water in it. The channel between it and the southeast side of the St. Lawrence River is three-quarters of a mile wide, with greatest depth at 9 fathoms (16^{m}5).

Berthierville, with a population of 3,325 in 1951, is situated on the mainland westward of the group of islands at the head of Lake St. Peter (page 31), a channel 150 yards (137^{m}2) broad, known as Chenal du Nord, suitable for vessels of light draught, separating it from Ile du Milieu and Ile au Castor. A vessel of this character can proceed northwestward of the latter, and the northeastern half of Ile Dupas (the largest of the group), from Ile aux Foins to Lake St. Peter, a distance of 12½ miles. Berthierville is 3 miles north from the southwest extreme of Ile aux Foins, and has communication with Montreal, Trois Rivières, and Quebec by the Canadian Pacific Railway. The station, named Berthier, distant 57 statute miles from Montreal, is 2 miles from the village, a short branch connecting them.

Wharves.—The Government wharf at Berthierville is 180 feet (54^{m}9) in length, with a depth of 6 feet (1^{m}8) at the face. At St. Barthélemi, 3 miles below Berthierville, is another Government wharf with a face 72 feet (21^{m}9) long and with a depth of 9 feet (2^{m}7) alongside.

Beacons and buoys.—Two white diamond-shaped beacons, situated near the south end of Ile du Milieu, in alignment, lead light draught vessels through

Chart 1338.

the deepest water between Ile Dorvilliers and Ile aux Foins. The available depth is 4 feet (1m2). Three black spar buoys, moored off the north end of Ile aux Foins, mark the south edge of this channel. A black spar buoy marks the easterly side of the southern entrance to Chenal du Nord. Two other sets of diamond-shaped beacons, on the west side of Ile du Milieu, lead small craft in deepest water through Chenal du Nord to Berthierville. Four red and one black spar buoys mark the channel from the mouth of Rivière La Chaloupe to Berthierville.

Directions.—From a point in the ship channel, 1½ miles above Sorel, bring Ile du Milieu beacons into alignment, ahead, bearing 286½°, and pass north of Ile aux Foins and the three black spar buoys marking the south edge of the dredged channel. When 100 yards (91m4) past the third buoy, leave the leading line and haul westward and southward, keeping mid-channel between Ile du Milieu and Ile aux Foins, until about 1½ cables beyond the southern point of the former, when alter course to the northward for the entrance to Chenal du Nord, passing west of the black spar buoy moored here. Follow the west shore, keeping 50 yards (45m7) distant, until the lower, or northern pair of leading beacons on Ile du Milieu come into alignment ahead, bearing 018°. This leading line is kept until abreast the red spar buoy, 200 yards (182m9) below the mouth of Rivière La Chaloupe. Passing the buoy on the port hand, follow the east shore, 50 yards (45m7) off, until the upper or southern pair of leading beacons on Ile du Milieu come into alignment astern, bearing 189°. This leading line is kept, until the black spar buoy moored abreast the church is reached, whence, passing the buoy on the starboard hand, follow the west shore, keeping about 40 yards (36m6) off, until the wharf is reached.

Ile Dorvilliers *(Lat. 46° 03′ Long. 73° 10′ W.)* lies a little northward of the line joining Ile St. Ignace and Ile aux Foins, and almost joins the southwest end of Ile Dupas, which gives it name to the following leading line:

Ile Dupas leading lights.—The front light, situated on the east shore of Ile Dorvilliers, is shown at a height of 46 feet (14m0) from a white, square, wooden building standing on a square, concrete pier 22 feet (6m7) high. The rear light, situated on the western end of Ile Dupas, 2,047 feet (623m9), 015° from the front light, is shown at a height of 80 feet (24m4), from a red-roofed lantern on a brown, square, steel, skeleton tower, with white, wooden slatwork on the upper portion, and with a white, wooden enclosed upper part. The lights are *fixed green* and in their alignment lead from light-buoy 1M to 3 miles above it.

Light-buoy.—A middle ground with a least depth of 25 feet (7m6) lies between Ile aux Foins and the southeast shore of the river; marking its northwest side is black light-buoy 1M, showing a *flashing white* light. The buoy lies 225 feet (68m6) southeast of Ile Dupas leading line.

Ile St. Ours, situated 7 miles southward of Ile aux Foins, is the northeastern of the group known as **Contrecœur Islands,** lying near the southeast shore of the St. Lawrence River. The group extends 6 miles from Ile au Dragon, 1¾ miles southwest of Contrecœur Village. Ile St. Ours is 1¼ miles long by a quarter of a mile in average breadth, its northeast extremity being, by the channel, 9 miles above the entrance to Richelieu River. The southeast shore of the St. Lawrence River, in this latter stretch, runs in a south-southwesterly direction, nearly straight; regularly increasing depths are found off both shores until within 1½ miles of Ile St. Ours. A highway follows the shore, half a mile back of which runs the Canadian National Railways.

Chart 1338.

Light and other buoys.—Marking the northeast entrance to the 550-foot (167m6) wide dredged cut, passing eastward of that island and known as Ile St. Ours Channel, is black light-buoy 5M, showing a *flashing white* light. It is moored 647 feet (197m2) east of Ile St. Ours Course range and 252 feet (76m8) upstream from its intersection with Lavaltrie range; and black and red spar buoy 6M, moored 237°, 2 cables from 5M.

The southwestern end of the cut is marked by a red light-buoy, 16M, moored 3,625 feet (1,104m9) downstream from the intersection of Petite Traverse Contrecœur and Ile St. Ours Course range, and 325 feet (99m1) west of the latter range. Black spar buoy 15M marks the opposite side of the channel at this point.

Between these buoys, which mark the upper end of the cut, are red spar buoys 8M, 10M, and 12M, and black can buoys 7M and 9M, and black spar buoy 11M.

Lanoraie *(Lat. 45° 57′ N., Long. 73° 13′ W.)* is situated on the northwest side of the river. Its wharf, $4\frac{3}{4}$ miles above the southwest extremity of Ile aux Foins, is 98 feet (29m9) long parallel to the stream, with a depth of 10 feet (3m0) alongside. The breadth of the river gradually decreases until a little more than halfway from the latter, its breadth is only about half a mile, with a depth of 9 fathoms (16m5). The Canadian Pacific Railway station is about $5\frac{1}{2}$ miles back from the village. The shore between Ile aux Foins and Lanoraie curves slightly outward.

On the opposite side of the river, about one mile below Lanoraie, are the large summer camps, Colonie Jeanne d'Arc and Colonie St. Arsène. There is a Government wharf, with a face 50 feet (15m2) in length, less than one-half mile below these camps, with a depth of one foot (0m3) at the face. Immediately below this wharf is another large summer camp called Colonie des Grèves.

Anchorage.—There is good anchorage anywhere between Sorel and Lanoraie, but at a point $1\frac{1}{2}$ miles below Lanoraie wharf is a submarine power cable which crosses the river in an easterly direction, and over which vessels must not anchor.

Lavaltrie Channel for light draught vessels, dredged to 15 feet (4m6) commences in the ship channel abreast of Lanoraie and passes southwesterly between Ile St. Ours and the northwest shore, for $5\frac{1}{2}$ miles to a point about one mile south of Lavaltrie, where it rejoins the ship channel. Near here it connects with Repentigny Channel (*see* page 59), affording continuous passage for vessels not over 14-foot (4m3) draught, from Lanoraie to Varennes, where it rejoins the ship channel.

The use of the steamer channels by vessels of less than 14-foot draught, unless such vessels require to stop at points on the ship channel, is rendered obligatory by an Order in Council of the 1st of August, 1914.

Ile de Lavaltrie is narrow, 6 cables in length, lying off the village of that name and separated from its shore by a passage nearly a quarter of a mile wide and 17 feet (5m2) deep.

Lavaltrie leading lights.—The front light, situated, on the east shore of Ile de Lavaltrie, is shown at a height of 25 feet (7m6) from a red lantern on a red square, open, steel frame tower with white, slatwork target with a vertical red stripe. (The front light building is removed in winter and a lantern on a pole used in spring, while the pier is submerged.) The rear light, 1,840 feet (560m8), $208\frac{3}{4}°$ from the front light, is shown at a height of 64 feet (19m5), from a

Chart 1338.

red, square steel, skeleton tower, with white, enclosed upper part, standing on a concrete pier. The lights, which are *fixed green*, lead through the northeast part of Lavaltrie Channel from abreast of black light-buoy, 5M, $3\frac{3}{4}$ miles to the alignment of Contrecœur Traverse leading lights, in a depth of 15 feet (4^m6).

With the exception of the above channel and the main ship channel, the greater part of the northwest shore is connected to Ile aux Foins and Contrecœur Islands by flats on which are several dry rocky patches.

Buoys.—Marking the southeast edge of the above portion of Lavaltrie Channel are moored red and black spar buoy 6M, two black light-buoys, 21R, and 41R, showing *flashing white* lights, and six black spar, can, or taper buoys, 25R, 29R, 33R, 35R, 37R, and 39R. Black light-buoy, 21R, is moored on the southeast side of the channel, 1·2 miles upstream from red and black spar, 6M. Black light-buoy 41R is at the junction of Lavaltrie and Contrecœur leading lines.

From buoy 41R, the channel is on the alignment of the Contrecœur Traverse leading lights (*see* page 56). Three black buoys, 45R, 47R, and 49R, mark the southeast edge of this portion of the channel which has a depth of 16 feet (4^m9).

Lavaltrie *(Lat. 45° 53′ N., Long. 73° 16′ W.)* is on the northwest shore and distant from Montreal $25\frac{3}{4}$ miles by ship channel; its church has two spires. The wharf has a pierhead 94 feet (28^m7) long, with a depth of 10 feet (3^m0) alongside.

Contrecœur, with a population of 1,435 in 1951, is situated close to the southeast shore of the river, $4\frac{1}{2}$ miles above the northeast extremity of Ile St Ours, the shore between, with a height of 20 to 30 feet (6^m1 to 9^m1), taking a slight inward curve. The village has railway connection by the Canadian National Railways with Sorel and Montreal.

Vessels of light draught can berth at the Government wharf, the approach to which, from the west, is by a narrow passage with a depth of 7 feet (2^m1), between Ile aux Rats on the south, and Ile Plante and Ile Hurteau on the north. A pair of beacons lead through this channel. The channel running north-northeastward from Contrecœur to the ship channel, southeast of Ile St. Ours, is broader and deeper. The wharf at Contrecœur has a pierhead 96 feet (29^m3) in length, with a depth of 7 feet (2^m1) along the face.

Ile St. Ours Course leading lights.—The front, or northern, aluminium-painted, square building, stands on the southeast shore, on the top of the bank, 2 miles below Contrecœur church. The rear, brown, skeleton tower, with white, wooden slatwork on the upper portion, and with white, wooden enclosed upper part, is erected 2,355 feet (717^m8), $181\frac{1}{4}°$ from the front light. Both exhibit *fixed green* lights from red-roofed lanterns, elevated, respectively, 61 and 104 feet (18^m6 and 31^m7) and their alignment leads through Ile St. Ours Channel from black light-buoy 5M to Bellmouth Curve.

Petite Traverse Contrecœur leading lights.—The front light, situated near the southeast shore on top of the bank, is shown at a height of 53 feet (16^m2) from a red-roofed lantern on a white, square, wooden building. The rear light, situated 1,730 feet (527^m2), 047° from the front light, is shown at a height of 103 feet (31^m4) from a red-roofed lantern surmounting a brown, square, steel, skeleton tower with white, wooden slatwork on the upper portion, and with white, wooden enclosed upper part. The lights, which are *fixed green*, lead in their alignment from Bellmouth Curve to Contrecœur Bend.

Charts 1339, 1338.

Bellmouth Curve.—Light.—Near the public highway and 1,750 feet (533m3), 168½° from Petite Traverse front leading light, a light will be exhibited from a pole, with a white, diamond-shaped daymark, for one month after the opening of navigation and one month before the close of navigation. It will mark the sharp bend in the channel before the light-buoys have been placed in the spring and after they have been removed in the autumn.

Contrecœur Course leading lights.—The front light, situated on the top of the river bank on the southeast shore, abreast the northern part of Ile St. Ours, is shown at a height of 52 feet (15m8) from a red-roofed lantern, on a white, square, wooden building. The rear light, situated 2,328 feet (709m6), 033° from the front light, is shown at a height of 106 feet (32m3) from a red-roofed lantern surmounting a brown, square, steel, skeleton tower with white, wooden slatwork on the upper portion and with white, wooden enclosed upper part. The lights, which are *fixed green,* lead in their alignment from Contrecœur Bend to Contrecœur Traverse.

Contrecœur Channel is the name given to the dredged channel northwest of Contrecœur Islands. The northeastern part, between Ile St. Ours and Ile Duval, being named Petite Traverse Contrecœur; the junction of the latter with Ile St. Ours Channel is known as Bellmouth Curve. In May, Contrecœur Islands are partly covered; consequently the channels present a different appearance to that of later months.

Bellmouth Curve.—Buoyage.—On the western side of Bellmouth Curve, in addition to red light-buoy 16M, is red light-buoy 20M, showing a *flashing red* light, moored about mid-way between light-buoys 16M and 26M. Marking the opposite side of the channel at this curve are black spar buoys 17M, 23M and black light-buoy 19M.

Marking the southeast side of Petite Traverse Contrecœur are three black spar buoys, 25M, 27M, and 29M. Opposite them are placed, respectively, red light-buoy 26M and red conical buoys 28M, and 30M.

Contrecœur Course.—The portion of Contrecœur Channel abreast Lavaltrie is called Contrecœur Course; the junction of the latter with Petite Traverse Contrecœur is named Contrecœur Bend, and its upper end, Contrecœur Traverse.

Light and other buoys.—On the southeast side of Contrecœur Bend is moored a black light-buoy, 31M, showing a *flashing white* light, bearing about 284°, distant 1·03 miles from Ile St. Ours Course front leading light; opposite it is placed red conical buoy 32M.

At the southwest end of Contrecœur Course is placed black light-buoy 41M, showing a *flashing white* light. Between 31M and 41M are moored four black spar buoys, numbered 33M, 35M, 37M, and 39M. Opposite 33M is placed red spar buoy 34M, and opposite 37M and 41M are moored red spar buoys 38M and 42M.

Chart 1339.

Contrecœur Traverse leading lights.—The front light *(Lat. 45° 50′ N., Long. 73° 17′ W.)* situated 200 yards (182m9) from the southeast shore of the river, and a third of a mile above Ile au Dragon, the southwestern Contrecœur Island, is shown at a height of 30 feet (9m1), from a white, square, wooden building on a white, concrete pier. The rear light, situated 2,110 feet (643m1),

Chart 1339.

194¼° from the front light, is shown at a height of 74 feet (22m6), from a red-roofed lantern on a brown, square, steel skeleton tower, with white, wooden slatwork on the upper portion and with white, wooden enclosed upper part. The lights, which are *fixed green*, lead in their alignment through Contrecœur Traverse from the bend, marked by spar buoy 45M, to the bend into the Verchères-Contrecœur Channel. This leading line also serves for the southern portion of Lavaltrie Channel.

Close westward of the above leading lights are two *fixed amber* leading lights, privately maintained, which lead to the Ore Transfer Dock. The lights in line bear 186½°.

Verchères-Contrecœur leading lights.—The front light, situated on the flats 7 cables, 302°, from Contrecœur Village, is shown at a height of 26 feet (7m9), from a tower with a white, octagonal, red-roofed lantern on a white, concrete pier, 21 feet (6m4) high. The rear light, situated on Ile Contrecœur, 9,126 feet (2,781m6) 040¼° from the front light, is shown at a height of 87 feet (26m5), from a brown, steel skeleton tower, with white, wooden slatwork on upper portion and with a white, wooden enclosed upper part, standing on a concrete pier. The lights, which are *fixed white*, lead in their alignment, through the Verchères-Contrecœur Channel.

Contrecœur local leading line.—A pair of beacons for the use of light draught vessels, using the narrow passage with 7 feet (2m1) of water, between Ile Plante and Ile aux Rats, is erected at Contrecœur and on Ile Hurteau. The eastern and deeper entrance passage, in which the current has a rate of 3 knots, is buoyed.

Verchères *(Lat. 45° 47′ N., Long. 73° 21′ W.)*—From Ile au Dragon, the southwestern of Contrecœur Islands, the southeastern shore of the St. Lawrence River trends in a general southwest direction, 5 miles to Verchères. The village had a population of 1,201, in 1951. Verchères wharf has a pierhead 92 feet (28m0) in length, with a depth of 6 feet (1m8) along the face. From the downstream end of the pierhead, a breakwater extends 220 feet (67m1) parallel to the wharf, and 280 feet (85m3) from the latter, forms a protected area for boats, with a depth of 6 to 8 feet (1m8 to 2m4). Along both sides of the outside breakwater is a depth of 8 feet (2m4).

Ile Bouchard.—The northeastern and larger of Verchères Islands, named Ile Bouchard, is separated from Ile Marie by a boat channel, the Chenal St. Pierre. The island, 5⅓ miles long, and a mile broad in its widest part, divides the river into two channels, that northwest of the island being suitable only for vessels of light draught. The ship channel, the narrower but deeper passage, passes southeastward of Verchères Islands.

Buoys.—On the northwest side of Contrecœur Traverse is a red spar buoy, 46M, bearing about 276°, distant 1·26 miles from Contrecœur church. On the southeast side of the same are placed four black spar buoys, 45M, 47M, 49M, and 51M. Abreast the middle one of these is moored red spar buoy 50M. Marking the turn on the Verchères-Contrecœur Channel is moored red light-buoy 52M, showing a *flashing red* light, distant 5,000 feet (1,524m0) from Contrecœur Traverse front leading light.

Two-thirds of a mile above the northeast extreme of Ile Bouchard, and on the northwest side of the Verchères-Contrecœur Channel, is moored a red spar buoy 76M. A red spar buoy, 54M, is moored half-way between 52M and 76M.

Chart 1339.

Poulier Ile au Bœuf.—Light-buoy.—On the northwest side of the channel, and 2 miles below Verchères, is a small island named Ile au Bœuf, and abreast its upper end, but on the southeast side of the channel, is a ridge with 12 feet (3m7) of water on it, named Poulier Ile au Bœuf. It is marked by black light-buoy 79M, showing a *flashing white* light.

Ile aux Prunes.—Light-buoy.—Between Ile au Bœuf and Verchères, and on the northwest side of the ship channel, is a slightly larger island named Ile aux Prunes, southward of the upper extremity of which is moored red light-buoy 82M, showing a *flashing red* light, distant 0·39 mile from Ile Bouchard front leading light.

Verchères Village leading lights.—The front light is shown from a lantern on a steel skeleton tower, at a height of 17 feet (5m2). The rear light, situated 1,938 feet (590m7), 220¼° from the front light, is shown at a height of 57 feet (17m4) from a steel, skeleton tower, surmounted by an aluminium painted enclosed watchroom and lantern, with an aluminium painted slatwork on the side facing the alignment. The lights are *fixed green* and their alignment coincides with that of Verchères-Contrecœur leading lights.

Verchères Traverse leading lights.—The front light, situated on the main shore, abreast the northeastern end of Ile aux Prunes, is shown at a height of 43 feet (13m1) from a red-roofed, white, octagonal, wooden lantern on a white circular stone base. The rear light, situated, 1,600 feet (487m7) 055½° from the front light, is shown at a height of 71 feet (21m6) from a red-roofed white octagonal wooden lantern. The lights which are *fixed green,* in their alignment lead through Verchères Traverse, past Verchères.

Ile Bouchard leading lights.—The front light, situated near the east end of Ile Marie, is shown at a height of 39 feet (11m9) from a red-roofed lantern on a white, square, wooden building standing on a white pier. The rear light, situated on Ile Bouchard, 8,082 feet (2,463m4), 037½° from the front light, is shown at a height of 76 feet (23m2), from a red-roofed lantern on a brown, square steel skeleton tower with white, wooden enclosed upper part. The lights, which are *fixed white,* in their alignment lead through the Cap St. Michel-Verchères Channel.

Pointe Marie *(Lat. 45° 45′ N., Long. 73° 23′ W.),* on the southeast shore of the river, is situated nearly 2 miles above Verchères wharf, the ship channel passing close to the point. Pointe Marie is not conspicuous as a point.

Light and other buoys.—A black light-buoy, 89M, showing a *flashing white* light, and marking the southeast side of the channel, lies about 252°, distant 0·67 mile from Verchères church. A black can buoy, 87M, bears 291°, distant 0·54 mile from the same church. Marking the bend on the opposite side of the channel, and about midway between these two buoys, is red spar buoy 88M. Close to Pointe Marie is moored black spar buoy 99M.

Ile Marie, separated from Ile Bouchard by a boat channel (page ..), extends northwest of the ship channel, for about 2½ miles, to abreast Pointe Marie.

Poulier Myrand.—Buoy.—A patch, with 9 feet (2m7) of water over it, lies on the island side of the channel, and near it is placed a red spar buoy, 96M, bearing about 238°, distant 1·30 miles from Verchères church.

Chart 1339.

Ile Beauregard, in mid-river, lies with its upper end 1¼ miles southwest of Ile Marie, being connected thereto, at low stages of the water, by Ile Desmarais and L'Ilet.

Poulier des Trois Bouées, southeast of Ile Beauregard, is the name given to a ridge through which a channel has been dredged.

Buoys.—The southeast side of the ship channel in this locality is marked by a black light-buoy, 103M, showing a *flashing white* light, and bearing about 074° from the upper end of Ile Beauregard. Opposite it is placed a red spar buoy, 104M.

Ile Hertel and **Ile Bellegarde,** almost covered in the early summer, lie close to the northwest side of the upper portion of the channel.

Cap St. Michel.—From Pointe Marie, the southeast shore of the river runs in a southwesterly direction, almost straight, about 3 miles to Cap St. Michel. The dredged channel from Verchères to Cap St. Michel passes close to the shore.

There is a **reporting station** at Cap St. Michel.

Light and other buoys.—A black light-buoy, 117M, showing a *flashing white* light, is moored about 041°, 0·67 mile from Ile Deslauriers front leading light. Red light-buoy 118M, showing a *flashing red* light, is moored 2¾ cables southwestward of 117M. Southeastward of the southern extremity of Ile Bellegarde is moored a red spar buoy 116M, distant about 1·09 miles from the same light.

St. Sulpice.—From Lavaltrie, the northwest shore of the St. Lawrence River trends in a general southwestward direction, 3¾ miles to a broad point, and then west-southwest 1¼ miles to St. Sulpice. Half a mile above Lavaltrie is the mouth of a stream called Rivière St. Jean, one-third of a mile south-southwest of which is the northeast extremity of Ile Mousseau, separated from the northwest shore by a boat channel.

There are two Government wharves at St. Sulpice. Near the church is the village wharf, with a face 52 feet (15ᵐ8) long and depth alongside of 5½ feet (1ᵐ6). About 1¼ miles above the church is a second wharf with a pierhead 93 feet (28ᵐ3) long, with a depth of 8 feet (2ᵐ4) at the face.

Chenal St. Pierre, between Ile Bouchard and Ile Marie, is buoyed and was formerly used by the St. Sulpice-Verchères ferry.

Ile Lebel.—From St. Sulpice *(Lat. 45° 50′ N., Long. 73° 21′W.),* the shore runs nearly straight in a southwest by south direction 6½ miles to the middle part of Ile Lebel, the passage between this shore and Ile Bouchard together with Ile Marie, having depths varying from 6 feet (1ᵐ8) to 6 fathoms (11ᵐ0).

Repentigny is situated a short distance back of Ile Lebel. There is a Government wharf here with a pierhead 72 feet (21ᵐ9) in length, the depth along the face being 9 feet (2ᵐ7).

Repentigny Steamboat Channel.—This channel commences in the Lavaltrie Channel, at black can buoy 49R, lying at the intersection of the Contrecœur Traverse and Mousseau leading lines. It passes between Ile Bouchard and the northwestern shore of the river, and continues along that shore to Repentigny, being separated from the ship channel by Ile Bouchard and the

Chart 1339.

other extensive Verchères Islands; from Repentigny a course obliquely across the river rejoins it to the ship channel at Varennes Curve above Ile Deslauriers. The distance is the same by either channel, about 19 miles.

Repentigny Channel is 300 feet (91^{m}4) wide, and dredged to a depth of 15 feet (4^{m}6). Leading lights lead consecutively throughout its length, and buoys mark the sides of the channel, black buoys on the port side and red buoys on the starboard side, proceeding up the river.

Mousseau leading lights are situated on concrete piers on the north side of Ile Bouchard. The front light is shown at a height of 18 feet (5^{m}5), from a red, steel, triangular framework with white, square slatwork on upper portion facing alignment and a white shed at the base. The rear light, situated 220° distant 2,022 feet (616^{m}3) from the front light, is shown at a height of 57 feet (17^{m}4) from a red, square, steel skeleton tower with white, square slatwork on upper portion facing alignment, and a white shed with red roof at the base. These lights, which are *fixed white,* in their alignment lead to the alignment of Bouchard Peninsula leading lights.

Buoys.—On this course, black spar buoys 51R and 53 R, and red conical buoy 54R, marking the north edge of the channel at the intersection of the Bouchard Peninsula leading lights, are passed, the distance run being about 1⅔ miles.

Bouchard Peninsula leading lights *(Lat. 45° 49′ N., Long. 73° 18′ W.)* are situated on the north side of Bouchard Peninsula, opposite St. Sulpice. The front light is shown at a height of 23 feet (7^{m}0) from a structure on a pier, and similar in all respects to the Mousseau front structure. The rear light, situated 230¼°, distant 2,558 feet (779^{m}7) from the front light, is shown at a height of 70 feet (21^{m}3) from a red-roofed lantern surmounting a red, square, steel skeleton tower with white slatwork on upper portion, and with white, enclosed upper part. These lights, which are *fixed white,* lead in their alignment to the alignment of the St. Sulpice Traverse leading lights.

Buoys.—On this course, black spar buoy 59R, lying 400 yards (365^{m}8) north of Mousseau front leading light, and black can buoy 65R, marking the south edge of the channel at the intersection of the St. Sulpice Traverse leading lights, are passed, the distance run being about 2½ miles.

St. Sulpice Traverse leading lights are situated on the northwest shore of the river and about one mile above St. Sulpice. The front light is shown at a height of 34 feet (10^{m}4) from a white, square, wooden tower. The rear light, 249°, distant 1,947 feet (593^{m}4) from the front light, is shown at a height of 77 feet (23^{m}5) from a structure similar in all respects to that of Bouchard Peninsula rear light. These lights, which are *fixed white,* in their alignment lead to the alignment of St. Sulpice Course leading lights.

Buoys.—On this course, 069°, red spar buoy 68R, and black can buoy 73R, marking the south edge of the channel at the intersection of the St. Sulpice Course leading lights, are passed, the distance run being about 1·2 miles.

St. Sulpice Course leading lights are situated on the north shore about half a mile below St. Sulpice. The light structures are similar in all respects to those of St. Sulpice Traverse leading lights. The front light is shown at a height of 41 feet (12^{m}5), near the shore, and the rear light at a height of 79 feet (24^{m}1), bearing 032¾°, distant 1,937 feet (590^{m}4) from the front. Both lights are *fixed white,* and in their alignment lead to the alignment of Ile Lebel leading lights.

Chart 1339.

Light and other buoys.—On this course, red spar buoy 80R, black spar buoy 81R and red light-buoy 88R, showing a *flashing red* light, and marking the north edge of the channel at the intersection of the Ile Lebel leading lights, are passed, the distance run being $3\frac{1}{2}$ miles.

Ile Lebel leading lights.—Off Repentigny on the west shore is Ile Lebel, joined to the mainland at low water. On it are erected leading lights. The front light is shown at a height of 17 feet (5^m2) from a square slatted daymark. The rear light, bearing 219°, distant 2,163 feet (659^m3) from the front light, is shown at a height of 49 feet (14^m9) from a red, square, steel skeleton tower with white, square slatwork on upper portion facing alignment, and with white shed with red roof at base. Both lights are *fixed white* and in their alignment lead to Repentigny Curve.

Buoys.—The distance run on this course is about $1\frac{1}{2}$ miles to red spar buoy 96R; then for three-quarters of a mile the channel, in Repentigny Curve southward, is marked by black spar buoys 97R, 103R, and 105R, and red spar buoy 100R.

Repentigny leading lights are situated on the shore, about a mile below Repentigny church. The front light is shown at a height of 19 feet (5^m8) from a white, square, wooden building with red-roofed octagonal lantern. The rear light 012¾°, distant 1,800 feet (548^m6) from the front light, is shown at a height of 45 feet (13^m7) from a red, square, steel skeleton tower with white, wooden, enclosed upper part and red-roofed lantern. Both lights are *fixed white*, and in line, astern, lead from Repentigny Curve into the ship channel at the lower end of Varennes Curve.

Buoys.—On this course, red spar buoys 106R, 112R, and 118R. and black spar buoys 111R and 113R, are passed, the distance run being about $2\frac{1}{4}$ miles.

Charts 1339, 1338.

Steamboat Channel directions.—From a point in the ship channel abreast Lanoraie, proceed 208¾°, with Ile de Lavaltrie leading lights in alignment ahead, passing west of red and black spar buoy 6M, west of black light-buoy 21R, and also west of six black can, spar, or taper buoys, numbered 25R, 29R, 33R, 35R, 37R, 39R, and black light-buoy, 41R, hauling to the southward round the last one to bring into alignment ahead, and bearing 194¼°, the Contrecœur Traverse leading lights, situated on the southeast shore. On this course, a vessel passes three black buoys on the port hand, numbered 45R, 47R, and 49R, the latter, a can buoy, marking the junction of the Lavaltrie and Repentigny Steamboat Channels. A vessel wishing to rejoin the ship channel may here continue on the same course and leading line, which leads into Contrecœur Traverse west of black spar buoy 45M.

If continuing in the steamboat channel, when abreast black can buoy 49R, haul westward and bring into alignment the Mousseau leading lights, seen ahead on Ile Bouchard, and bearing 220°. Hold this leading line, passing on the port hand black spar buoys 51R and 53R, until abreast red conical buoy 54R, on the starboard hand. Then haul westward again to the alignment of the Bouchard Peninsula leading lights, seen ahead on the north extremity of Ile Bouchard, and bearing 230¼°. Pass north of black spar buoy 59R, holding this course and leading line until abreast black can buoy 65R, on the port hand, when alter course again to the westward, bringing into alignment ahead St. Sulpice Traverse leading lights, bearing 249°, situated on the northwest mainland shore, and passing on the starboard hand red spar buoy 68R. Continue on this

Chart 1339.

leading line until abreast black can buoy 73R, when leave the leading line and haul round the buoy, to the southward and bring into alignment, astern, St. Sulpice Course leading lights. On this leading line, steering 212¼°, pass between red spar buoy 80R and black spar buoy 81R. Red light-buoy 88R, showing a *flashing red* light, should now be seen slightly on the starboard bow. When abreast of it, alter course a little to the westward to bring into alignment ahead the leading lights of Ile Lebel, bearing 219°. Hold this leading line, until abreast red spar buoy 96R on the starboard hand, when haul gradually southward through Repentigny Curve, passing west of black spar 97R, and between black spar 103R and red spar 100R, bringing into alignment, astern, the Repentigny leading lights, situated on the north shore about one mile below Repentigny church. This, the final course of the steamboat channel, leads 193¾° into the ship channel, about one mile north of Varennes Village on the south shore, and one-third mile north of black light-buoy 133M. On this course, black spar buoys 105R, 111R, and 113R on the port hand, and red spar buoys 106R, 112R, and 118R, on the starboard hand, are passed.

Ile Deslauriers *(Lat. 45° 43′ N., Long. 73° 26′ W.)* lies about 400 yards (365m8) westward from Cap St. Michel, the ship channel, known as Cap St. Michel Curve, with a depth of 6 fathoms (11m0), passing between them.

Ile Deslauriers leading lights.—The front *fixed green* light, situated on Ile Deslauriers, is shown at a height of 40 feet (12m2) from a red-roofed lantern, surmounting an aluminium-painted, square, watchroom, standing on a white, square, concrete pier. The rear light, *fixed green*, 9,343 feet (2,847m8), 217½° from the front light, and situated on the east shore of Ile Ste. Thérèse near its north end, is shown at a height of 89 feet (27m1) from a red-roofed lantern on a brown, square, steel skeleton tower, with white, wooden slatwork on the upper portion and with white, wooden enclosed upper part. The alignment of these lights coincides with that of the Ile Bouchard leading lights and leads through the Cap St. Michel-Verchères Channel.

Light and other buoys.—The bank from Ile Deslauriers is marked by red conical buoy 122M, and red light-buoy 124M, showing a *flashing red* light; they bear respectively, about 182° and 200° from the light on Ile Deslauriers. Two black spar buoys are moored on the eastern side of the channel, but the upper one lies outside the channel.

Varennes.—From Cap St. Michel, the southeast shore turns south by west for about 2 miles to Varennes *(Lat. 45° 41′ N., Long. 73° 26′ W.)* In 1951, the village had a population of 1,104. Its handsome church has two spires. A dredged channel, 500 feet (152m4) wide and 14 feet (4m3) deep leads to the wharf.

Poulier du Calvaire, a ridge dry at low stage of the water, lies 300 yards (274m3) from the southeast shore, three-quarters of a mile below Varennes.

Poulier Varennes, a ridge with 14 feet (4m3) of water over it, is situated near the southeast side of the ship channel, and half a mile westward of Varennes.

Light and other buoys.—Marking the channel between Poulier du Calvaire and Poulier Varennes, are the following buoys, their respective bearings being from Varennes church; black light-buoy 129M, showing a *flashing white* light, about 342°; black can buoy 131M, about 326°; black light-buoy 133M, showing a *flashing white* light, about 301°; black can buoy 137M, about 253°; red conical buoy 128M, about 346°; red conical buoy 130M, about 330°; red conical buoy 132M, about 308°; and red conical buoy 138M, opposite 137M.

Chart 1339.

Rivière des Prairies.—From Ile Lebel, near Repentigny, the northwest shore of the St. Lawrence River trends nearly 2 miles southwestward to the lower entrance point of Rivière des Prairies (a mouth of the Ottawa River), the mouth of which is half a mile wide. The southern entrance point is named Bout de L'Ile, being the northeast extremity of Montreal Island. The highway bridge crosses the river near its mouth, the bridge of the Canadian National Railways being less than half a mile farther up. Between the mouth of the river and Ile Deslauriers are several islands, under various names, with passages between them available to vessels of light draught.

Ile Ste. Thérèse, about 3 miles long and a mile in greatest breadth, occupies the greater part of the St. Lawrence River between Varennes and the northeastern portion of Montreal Island, being separated from the latter by a passage with a minimum width of 300 yards (274^{m}3) and through which a draught of not more than 12 feet (3^{m}7) can be carried. The ship channel passes between Iles Ste. Thérèse and Varennes.

Ile Ste. Thérèse Lower leading lights.—The front light, situated on the northeast side of Ile Ste. Thérèse, about three-quarters of a mile southward from the north end, is shown at a height of 30 feet (9^{m}1) from a white, square, wooden red-roofed lantern, surmounting a white, square wooden tower. The rear light, situated 540 feet (164^{m}6), 218° from the front light, is shown at a height of 48 feet (14^{m}6) from a white, square, wooden building with red roof. The lights are *fixed green* and in their alignment lead through Varennes Channel from Cap St. Michel Curve to Varennes Curve.

Ile á l'Aigle *(Lat. 45° 40′ N., Long. 73° 27′ W.)*—Lying southeast of the upper portion of Ile Ste. Thérèse, and southwest of Varennes Village, is a group of islands under various names, the largest called Ile à l'Aigle, situated immediately southeast of the ship channel. Ile aux Vaches, joined at low stages of the water to the southwest extremity of Ile Ste. Thérèse, lies northwest of the channel.

Ile à l'Aigle leading light.—The front light, which is *fixed green* is situated on the western side of Ile à l'Aigle, near the lower end of the island, and is shown at a height of 30 feet (9^{m}1) from a white, pentagonal, wooden lantern on a white, rectangular concrete pier. The rear light, *fixed white,* is situated on the east shore of the island, 1,543 feet (470^{m}3), 184° from the front light, and is shown at a height of 52 feet (15^{m}8) from a white, square, wooden building on a white, rectangular, wooden pier. The lights, in their alignment, lead through the channel westward of Poulier Varennes from Varennes Curve to abreast the lower extremity of Ile au Beurre.

Ile aux Vaches is three-quarters of a mile long, and separated from Ile Ste. Thérèse only at high stages of the water; the ship channel, 8 fathoms (14^{m}6) deep, passes close to its eastern side.

Ile aux Vaches Traverse leading lights.—The front light, *fixed green,* is also the front light of the Ile à Aigle leading line. The rear light, *fixed green,* is situated in Varennes Village, 5,667 feet (1,727^{m}3), 035° from the above front light, and is shown at a height of 80 feet (24^{m}4) from a red, steel skeleton tower with white, wooden slatwork on upper portion and with white, wooden enclosed upper part. The lights in their alignment lead through Ile aux Vaches Traverse.

Island of Montreal is the largest of the group lying at the junction of the St. Lawrence and Ottawa Rivers, its total length northeast and southwest being about 31 statute miles, and its greatest breadth, 10 miles. The next in size is

Charts 1352, 1339.

Ile Jésus, immediately northwest of the Island of Montreal, being separated therefrom by a branch of the Ottawa called Rivière des Prairies, a shallow and narrow channel. (*See* chart 1449).

Ile Jésus is about 21 statute miles long in the same direction, with a greatest width of $7\frac{1}{2}$ miles. Rivière des Mille Iles, the narrow channel separating it from the main shore, is spanned by several bridges, as is also Rivière des Prairies.

Pointe aux Trembles is situated on the Island of Montreal, 4 miles above the mouth of the Rivière des Prairies, the shore between forming a slight inward curve, with a passage for light draught vessels between this shore and Ile Ste. Thérèse. There is a wharf at Pointe aux Trembles.

Ile Ste. Thérèse Upper leading lights.—The front light, situated on the south shore of Ile aux Vaches, is shown at a height of 20 feet (6m1) from a white, octagonal, wooden lantern on a concrete pier. The rear light, situated on a pier below the river bank, on the southeast side of Ile Ste. Thérèse, and 4,314 feet (1,314m9), 025°, from the front light, is shown at a height of 84 feet (25m6) from a red, steel skeleton tower with white, wooden slatwork on upper portion, and with white, wooden enclosed upper part. The lights are *fixed white* and in their alignment lead through Pointe aux Trembles Channel.

Light and other buoys.—A black light-buoy, 141M, showing a *flashing white* light, is moored on the southeast side of Ile Ste. Thérèse Channel, bearing about 135° from Ile Ste. Thérèse Upper rear leading light; a black can buoy, 147M, on the southeast side of Ile aux Vaches Traverse, bears about 191° from the light on Ile aux Vaches; red conical buoy 148M, bears about 195° from the same light; and red conical buoy 150M, bears about 208°, distant 0·74 mile from this light.

Caution.—The current here, which has a rate of about $2\frac{1}{4}$ knots, sets across the channel in a northward direction and must be guarded against.

Buoys.—Above the last mentioned buoy, and on the southeast side of the channel, are moored black light-buoy 151M, showing a *flashing white* light, and black can buoy, 155M, bearing, respectively, 051° and 105° from Pointe aux Trembles church. On the opposite side of the channel, and midway between the latter two buoys, is moored red spar buoy 152M.

Longue Pointe *(Lat. 45° 35′ N., Long. 73° 30′ W.)*—From Pointe aux Trembles, the northwest shore of the St. Lawrence River, about 20 feet (6m1) high, trends southwestward and then southward for a total distance of $3\frac{1}{2}$ miles to Longue Pointe.

Wharves.—Buoys.—In the bight, between Pointe aux Trembles and Longue Pointe, are situated a number of large wharves with depths of 30 to $32\frac{1}{2}$ feet (9m1 to 9m9) alongside. The channel of approach from the ship channel to the three northern wharves, Montreal East wharf, British American Oil Company and Shell Oil Company wharves, 30 feet (9m1) in depth, is marked by a red spar buoy 156M, at the entrance. The centre line of this channel is marked by two *fixed green* leading lights located on the British American Oil Company's wharf. The channel of approach of the three southern wharves, Imperial Oil Company, McColl-Frontenac Oil Company, and Canada Cement Company wharves, with a limiting depth of 35 feet (10m7) is marked at its entrance by red spar buoy 160M, and a red and black conical buoy 162M. Two *fixed green* leading lights, shown at elevations of 35 and 50 feet (10m7 and 15m2), from poles with white, diamond-shaped daymarks, mark the centre line of this channel. The front light

Charts 1352, 1339.

is located on the Imperial Oil Company's wharf, and the rear light, 840 feet (256^{m}0), 252° from the front. The edge of shoal water off the two southern wharves is marked by two black spar buoys, 161R and 163R, red and black conical buoy 160R marks the junction of these two approach channels.

Anchorage.—Buoys.—An anchorage is located east of the ship channel just above Pointe aux Trembles; the east side of the anchorage is marked by two black spar buoys and the downstream and upstream extremes by black light-buoy 157M, and black can buoy 161M, respectively.

A **signal station** is established close to the extremity of Longue Pointe, for the purpose of day and night communication with passing vessels. It is equipped to receive and send messages by flag signals.

Tetreauville leading lights.—The front light, situated on top of the northwest river bank, about three-quarters of a mile below Longue Pointe, is shown at a height of 28 feet (8^{m}5), from a red-roofed lantern on a white, square, wooden building. The rear light, situated 2,171 feet (661^{m}7), 205° from the front light, is shown at a height of 94 feet (28^{m}7) from a red-roofed lantern on a red, square, steel skeleton tower with white, wooden slatwork on the upper portion facing the channel and with white, wooden, enclosed upper part. The lights are *fixed green;* their alignment coincides with that of Ste. Thérèse Upper leading lights, and leads through Pointe aux Trembles channel from Ile aux Vaches Traverse to Longue Pointe Curve.

Longue Pointe Traverse leading lights.—The front light, situated on the top of the northwest river bank, about 1·7 miles below Longue Pointe church, is shown at a height of 64 feet (19^{m}5) from a white, square, steel skeleton tower with a white day beacon on the upper portion, surmounted by a white lantern with a red roof. There is a small shed at the base. The rear light, situated 865 feet (265^{m}1) 349¾° from the front light, is shown at a height of 84 feet (25^{m}6) from a similar structure. The lights are *fixed green* and in their alignment lead through Longue Pointe Traverse.

Buoys.—A black light-buoy, 157M, showing a *flashing white* light, is moored on the southeast side of the channel, about 176°, distant 0·65 mile from Pointe aux Trembles church. Black can buoy, 165M and black light-buoy 167M, showing a *flashing white* light, moored about 012°, 1·18 miles and 014°, 0·80 mile, respectively, from Longue Pointe church, mark the east side of Longue Pointe Curve. Between buoys 157M and 165M, on the same side of the channel, are black can buoy 161M and black light-buoy 163M, showing a *flashing white* light, distant about 1·18 miles and 1·78 miles, respectively, from Pointe aux Trembles church. On the northwest side of the channel is moored red spar buoy 160M about one mile from Pointe aux Trembles church, and also marks the northeastern entrance point of the channel leading to the Imperial Oil Company's wharf; red conical buoy 164M is moored opposite 163M.

Black can buoy 169M and black light-buoy 171M, showing a *flashing white* light, bearing, respectively, 034° distant 0·5 mile, and 085°, distant 0·35 mile from Longue Pointe church, mark the eastern side of Longue Point Traverse.

Caution.—The current at the lower end of Longue Pointe Curve sets northward of the downward course.

Anchorage ranges.—Nine sets of anchorage range beacons have been established between Longue Pointe and Tétreauville low light. They are

Chart 1340.

numbered consecutively from Longue Point, northward, and are parallel to each other, each set bearing 261°. The western limit of the anchorage is marked by two red spar buoys, 166R and 168R.

Boucherville.—From Varennes, the southeast shore trends southward, $4\frac{1}{2}$ miles to the village of Boucherville. The mouth of the St. Charles River is situated on this coast half a mile from Varennes. There is good water at the Boucherville wharf for light draught vessels. The village had a population of 1,583 in 1951.

Boucherville Islands lie between Boucherville and Longue Pointe, and in the direction of the river have a total length of $5\frac{1}{4}$ miles, with a breadth of $1\frac{1}{4}$ miles. The western island, called Grandes Battures Tailhandier, is almost covered in the spring freshets. Boucherville Islands are separated from each other by shallow boat passages. The upper island, in two parts, is named Les Iles Vertes, while the lower, or northeastern island, is known as Ile Grosbois.

There is passage for light draught vessels between Ile Grosbois and the Ile à l'Aigle group (page 63), and between Boucherville Islands and the southeast shore of the St. Lawrence River.

Seaplane base.—There is a seaplane base between the upper end of Les Iles Vertes and the south shore. A channel has been dredged across the flats from the ship channel to the dredged areas in the lee of the islands where anchorage is provided.

Longueuil *(Lat. 45° 32′ N., Long. 73° 31′ W.)*—From Boucherville, the southeast shore of the St. Lawrence River trends in a general southwest by south direction, with a slight inward curve, nearly 5 miles to Longueuil. The church at Longueuil is a very imposing edifice. There are two wharves, both in ruins.

In the small basin, close northwestward of the Excel Boating Club, is an area which has been dredged to 8 feet (2^m4).

Poulier à Gagnon is the name given to a ridge with 11 feet (3^m4) of water over it, on the flat stretching off from the southwest end of Les Iles Vertes.

Longueuil Shoal is near the outer edge of the flat extending nearly two-thirds of a mile from Longueuil. It is included in the extensive area used as a dumping ground, which extends for nearly 2 miles below Ile Ronde. This area should not be entered, by even small craft, without local knowledge, there being depth of one to 4 feet (0^m3 to 1^m2) a short distance within the 5-fathom (9^m1) contour. Depths over the entire area are irregular.

St. Lambert.—From Longueuil, the southeast shore of the St. Lawrence River turns rather abruptly southward 2 miles to St. Lambert. The shore is fronted by an extensive bank, dry at low stages of the river, and almost joined to Ile Ste. Hélène. The high water tower at St. Lambert, coated with aluminium paint, is a very conspicuous object.

Ile Ronde, Ile Ste. Hélène and Ile Verte, between Longueuil and St. Lambert, have a total length of about one mile, the breadth of Ile Ste. Hélène, the largest and highest, being a third of a mile. Access to the island is afforded by the Jacques Cartier bridge.

Maisonneuve is the northeastern district of the city of Montreal. It has three piers known as Sutherland, Tarte, and Laurier, the depths at which are, respectively, $32\frac{1}{2}$, 30, and 30 to $32\frac{1}{2}$ feet (9^m9, 9^m1, and 9^m1 to 9^m9). The first

Chart 1340.

mentioned, and northeastern pier, is $2\frac{1}{2}$ miles southwest of Longue Pointe. A retaining wall, extending 1,450 feet (442m0) northeastward from this pier, has a depth of over 30 feet (9m1) alongside.

Wharves.—In the slight bight, between Longue Pointe and Sutherland pier, are situated the Vulcan and Racine wharves, with an approach channel of 28 feet (8m5) depth following the northwest shore from the ship channel at Longue Pointe. The Racine Channel is marked on the east, or Longue Pointe Shoal side, by four black spar buoys, numbered 173R, 175R, 179R, and 183R, the latter lying abreast of Racine wharf. On the west, or mainland side, are two red spar buoys, 174R located 1,100 feet (335m3) below Vulcan wharf, and 178R, opposite to 179R, and 760 yards (694m9) below Racine wharf. Two additional black spar buoys, 185R and 187R, mark the eastern side of this channel, above Racine wharf.

One and two-third miles above Longue Pointe are the shipbuilding works and dry docks of the Canadian Vickers Limited (*see* page 68). A channel with a minimum width of about 1,000 feet (304m8) has been dredged to a depth of 30 feet (9m1) from the ship channel to the shipbuilding berths and dry dock. Its entrance is abreast black light-buoy 177M, and is marked on the northern side by two red conical buoys, 178M, 180M, and red and black conical buoy 182M, and at its southern entrance point by red and black conical buoy 179M. Two *fixed green* lights, shown at elevations of 50 and 65 feet (15m2 and 19m8) from poles with white, diamond-shaped daymarks attached, lead through this channel.

Poulier de la Longue Pointe.—Between Longue Pointe *(Lat. 45° 35′ N., Long. 73° 30′ W.)* and the plant of Canadian Vickers Limited, an extensive shoal, with a least depth of 4 feet (1m2) near its upper end and 12 feet (3m7) at the lower end, extends out 3 cables from shore, with a navigable 28-foot (8m5) dredged channel between it and the mainland from Longue Pointe to Racine wharf, marked as above described. A buoyed channel, 200 feet (61m0) wide and 30 feet (9m1) deep, has been dredged from the upper end of this channel to that leading to Canadian Vickers Ltd. dry dock basin.

Forsyth Shoal, extending from the plant of Canadian Vickers Ltd., to the end of the retaining wall northward of Sutherland pier, has a maximum width of 1,000 feet (304m8), to the edge of the ship channel.

Montreal, the chief commercial city of Canada, and the centre of the various railway systems, is situated on the southeast side of Montreal Island, and in the southwestern portion of Hochelaga County. In 1951, the city had a population of 1,021,520. The city, founded in 1642, is built on a series of natural terraces at the foot and on the slopes of Mount Royal, which rises to the height of 760 feet (231m7) at the distance of $1\frac{3}{4}$ miles from the St. Lawrence River. The lower portion of the city is commercial, the higher, the residential part.

The metropolis is at the head of the St. Lawrence River ship channel and the head of ocean navigation, and for an average of $7\frac{1}{2}$ months of the year has direct ocean communication with European and United States ports. The distance from Montreal to Liverpool, via Strait of Belle Isle, is 2,789 nautical miles, and via Cabot Strait and Cape Race is 2,989 miles. It is also at the foot of inland navigation of the Great Lakes system, and from Montreal vessels, drawing not over 14 feet (4m3), may proceed by the rivers, lakes and their connecting canals for 1,161 nauticals miles to the head of Lake Superior at Duluth.

Chart 1340.

Montreal Harbour for administrative purposes extends from Bout de L'Ile, the northeast point of Montreal Island, to 3,760 feet (1,146^{m}0) above Victoria bridge and parallel thereto, a distance of about 16 miles. The north end of the Guard or Mackay pier is distant, by the ship channel, 138$\frac{1}{4}$ nautical miles from abreast the Custom-house at Quebec; 70$\frac{3}{4}$ miles from abreast the Ursuline convent at Trois Rivières, and 38$\frac{3}{4}$ miles from the mouth of the Richelieu River, Sorel.

Montreal Harbour is controlled by The National Harbours Board, whose jurisdiction extends over the above waterfront, including both sides of the river.

Harbour Regulations.—No vessel is allowed to take up a berth in the harbour of Montreal, excepting that assigned her by the Harbour Master.

Colours.—The colours of every ship shall be kept hoisted until a berth has been assigned her, and the "Blue Peter" is to be hoisted twenty-four hours previous to her departure.

Speed.—No vessel while within the harbour shall move at such speed as to cause damage or inconvenience to other craft.

Anchoring.—No vessel shall anchor within the Harbour limits without first obtaining the permission of the Harbour Master. No vessel, while under way or drifting, shall trail her anchor except in case of an emergency.

Watch.—A watch is to be kept from sunset to sunrise, on board all vessels in the harbour.

No rubbish, ashes, or other materials is allowed to be thrown into the harbour.

(For other regulations see "By-laws 1 to 83 of Montreal Harbour".)

Shipping.—Transatlantic steamship companies operating vessels between Montreal and foreign ports throughout the world include such lines as Canadian National Steamships, Canadian Pacific Steamships, Cunard-White Star, Ltd., Elder-Dempster & Co., Furness Withy & Co., Ltd., New Zealand Shipping Co. Ltd., Ocean Dominion Steamship Corporation, and various other companies. There are also companies trading with the United States Atlantic ports and with the Maritime ports of Canada.

Shipbuilding.—There are several shipbuilding plants located at Montreal, the largest of which is that of Canadian Vickers, Limited, at Maisonneuve.

Dry Docks.—The "Duke of Connaught" floating ship dock, belonging to and located at the Canadian Vickers Ltd. plant at Maisonneuve, is one of the largest and most modern of its kind. It can accommodate vessels of over 600 feet (182^{m}9) in length, 100-foot (30^{m}5) beam and 27$\frac{3}{4}$-foot (8^{m}5) draught. It has a lifting capacity of 25,000 tons.

Three dry docks are located in the Lachine Canal. Montreal Dry Dock Co. have two of these. No. 1 dock has a greatest available length of 430 feet (131^{m}1), width at entrance 44$\frac{2}{3}$ feet (13^{m}6), depth over sill 12$\frac{1}{4}$ feet (3^{m}8). No. 2 dock has a greatest available length of 430 feet (131^{m}1), width at entrance 50 feet (15^{m}2), depth over sill 15$\frac{1}{4}$ feet (4^{m}7).

St. Lawrence Dry Docks Ltd. have one dock, with greatest available length of 282 feet (86^{m}0), width at entrance 46 feet (14^{m}0), depth over sill 14$\frac{1}{2}$ feet (4^{m}4).

Chart 1340.

Repairs to vessels and engines can be made at the above shipbuilding and docking plants, as well as at the works of a number of other marine engineering firms.

Berthing accommodation.—There are approximately 100 berths for the accommodation of ocean-going vessels. The principal piers, other than those between Maisonneuve and Longue Pointe, already described, are:

Mackay pier, constructed for the protection of the upper and principal landing piers at Montreal, extends northward 7,250 feet (2,209^{m}8) from the Montreal end of Victoria bridge.

Bickerdike pier *(Lat. 45° 30′ N., Long. 73° 33′ W.),* one-half mile in length, trends about north and lies 250 yards (228^{m}6) west of the Guard pier. Along the western side is a depth of 29 feet (8^{m}8) and on the eastern side there is the same depth for a distance of 1,280 feet (390^{m}1) from the outer end of the pier.

Windmill Point wharf, separated from Bickerdike pier by Windmill Basin, has a depth of 30 feet (9^{m}1) along its entire length of approximately 3,000 feet (914^{m}4).

Alexandra pier, the southernmost of four projecting from the harbour front, lies about 850 feet (259^{m}0) northward of the entrance to the Lachine Canal. It has a total quay frontage of 2,900 feet (883^{m}9), and a depth of 32½ feet (9^{m}9) alongside.

King Edward pier lies next northward from Alexandra pier and has a total quay frontage of 2,900 feet (883^{m}9), with a depth alongside of 32½ feet (9^{m}9).

Jacques Cartier pier, next northward of the above pier, with a total frontage of 2,500 feet (762^{m}0), has a depth alongside of 29 feet (8^{m}8).

Victoria pier, the northernmost of the four, and opposite Bonsecours Market, and the Canadian Pacific Railway Place Viger station, is L-shaped, with a total length on the outside of 2,000 feet (609^{m}6) and depth alongside of 29 feet (8^{m}8). Its outer berths are used by the larger ships, and the inner berths, forming Market Basin, with a total length of 2,900 feet (883^{m}9), and having a depth of 25½ feet (7^{m}7), are for the accommodation of river traffic. Victoria pier has an imposing clock tower erected near its northeast end, as a sailors' memorial.

Saw-tooth wharves, about one mile downstream from Victoria pier, extend from section 30 to 35, each with depths of 30 feet (9^{m}1) alongside, and each 500 feet (152^{m}4) long with the exception of the lowest, which is 900 feet (274^{m}3) long.

Immediately northward of the above wharves is the wharf of the Dominion Coal Company, 1,185 feet (361^{m}2) in length; adjoining it is a high level wharf, 980 feet (298^{m}7) in length. The depth at both these wharves is 30 feet (9^{m}1). Laurier, Tarte, and Sutherland piers have already been described (*see* page ..).

One and three-quarters miles below Longue Pointe is the Canada Cement Company wharf, 726 feet (221^{m}3) in length, with a depth of 30 feet (9^{m}1) alongside. Northward of it are the following wharves: McColl-Frontenac Oil Company, 1,235 feet (376^{m}4) long, depth alongside 32½ feet (9^{m}9); Imperial Oil Limited, 750 feet (228^{m}5) long, depth alongside 31 feet (9^{m}4); Shell Oil Company

Chart 1340.

and Lasalle Petroleum Company, berthing length 907 feet (276^{m}4), depth alongside 30 feet (9^{m}1); Sun Oil Company, 107 feet (32^{m}6) long, depth alongside 30 feet (9^{m}1); British American Oil Company, 775 feet (236^{m}3); and Montreal East; 340 feet (103^{m}6) long, depth alongside 30 feet (9^{m}1).

Sheds.—Upon these piers and quays are 20 steel two-storey cargo sheds and six single-storey sheds, and in addition to their cargo space contain offices, waiting rooms, lunch rooms, workshops, and stores. For the handling of cargoes to the upper levels, there are installed electric hoists with capacities of 20 tons each.

A 75-ton **floating crane** is available for handling heavy package freight and a fleet of floating cranes, ranging in capacity from 5 to 15 tons, and eight handy locomotive cranes of 10 to 30 tons lifting capacity, are also available.

Elevators.—Montreal is the greatest grain-exporting port in the world and its total elevator storage capacity amounts to 15,162,000 bushels. By a grain conveyor system that extends to 30 grain berths in the harbour, 23 vessels can be loaded simultaneously, and the aggregate rate of delivery is over 200,000 bushels per hour.

Cold storage.—A large warehouse and cold storage plant stands at the foot of Beaudry Street, opposite Victoria pier. It has the most modern equipment, and a storage capacity of 4,628,000 cubic feet.

Coal and fuel oil.—Large stocks of coal and fuel oil are kept by the various companies, and can be loaded by lighter or alongside the wharves. The Dominion Coal Company and Canadian Import Company have storage capacities of 335,000 and 125,000 tons, respectively; The Century Coal has a storage capacity of 60,000 tons.

Harbour railway terminals.—These, in common with the piers, berths, elevators, sheds, and warehouses, etc., are under the jurisdiction of the National Harbours Board, which controls nearly 70 miles of track along the waterfront, connecting all piers, quays, warehouses, etc., and with connections to every railway that enters or terminates at Montreal.

Wintering.—Vessels of less than 14-foot (4^{m}3) draught winter in Lachine Canal between the piers, about one-half mile above Lock No. 2.

Fresh water is supplied from the Board's hydrants at tariff rates. (*See By-law 88.*)

Fire.—In the event of fire occurring either on shipboard or on the wharves in Montreal Harbour, the National Harbours Board tug "*St. Peter*" (which has a powerful fire-pump) may be called from 9 a.m. to 5 p.m. daily, except Sunday, through telephone "Marquette 3781". Night and Sunday call, through "Marquette 3308".

A **coast radio station** is established at Montreal, the mast being erected in Côte St.-Michel near Rivière des Prairies, on the northwest side of Montreal Island. The call letters are VCA. (*See Radio Aids to Marine Navigation.*)

Reporting station.—In the Aldred Building, Place d'Armes, is a Department of Transport reporting station for receiving complaints from, and passing out information, day and night, to vessels in the harbour and vicinity. (For particulars *see* page xxi).

Consuls.—There are Consuls, or Consular Agents, resident in Montreal, for all the principal maritime nations.

Chart 1340.

Sailors' Homes.—The Montreal Sailors' Institute is situated at 352 Place Royale, opposite the old Customs-house, and the Catholic Sailors' Club at the corner of St. Peter and Common Streets. Sick seamen are sent either to the General Hospital or Notre Dame Hospital.

Season of Navigation.—During the period 1945 to 1955, inclusive, the average date that the channel from Montreal to Quebec was open was April 12, the average date of the first arrival from sea was April 15; the average date of the last departure for sea was December 11.

In the year 1952 the channel from Quebec to Montreal was clear of ice, and navigation opened in Montreal Harbour, on April 12; the first arrival from sea was on April 13; the last departure for sea, and the closing of navigation in Montreal Harbour was December 10. (*For average dates during the period 1887 to 1951, inclusive, see* page xxvii).

Communication.—By railway.—Montreal is connected with all parts of Canada and the United States.—By water.—In addition to sea-going lines there is weekly communication with Kingston, Toronto, Hamilton, and intermediate ports, as well as with the upper Great Lakes. A regular steamship service is maintained to Quebec and intermediate ports, besides various others below Quebec. Vessels run to Gaspé, Charlottetown, Pictou, Sydney and other southern and northern gulf ports; to St. Johns and Corner Brook, Newfoundland, etc.

Jacques Cartier bridge *(Lat. 45° 31′ N., Long. 73° 32′W.)*—This highway bridge crosses the river, abreast the lower end of Ile Ste. Hélène, to which island the bridge has access. The length of the main span, centre to centre of main piers, is 1,097 feet (334^{m}4), giving a clear waterway of 1,000 feet (304^{m}8). The navigation clearance in the main channel is 150 feet (45^{m}7) at high water, with 163 feet (49^{m}7) for a length of 500 feet (152^{m}4) under the centre of the main span.

Bridge lights.—Two *fixed white* lights, elevated about 150 feet (45^{m}7), and visible upstream and downstream, are shown from the under side of the main span of the bridge. The lights define the limits of the channel under the bridge.

Victoria bridge.—This railway and roadway steel structure crosses the St. Lawrence River from Pointe St. Charles to St. Lambert on the southeast shore, the length from shore to shore being 7,350 feet (2,240^{m}3). It has 24 spans; that, nearly is the middle of the river and through which is the steamer channel, is nearly 350 feet (106^{m}7) in length.

Ile Ronde leading lights.—The front light, situated on the northeast end of Ile Ronde, is shown at a height of 42 feet (12^{m}8) from a white, square, wooden building standing on a white, square, concrete pier. The rear light, situated on a pier, in 2 feet (0^{m}6) of water off the northwest end of Ile Ste. Hélène, 2,158 feet (657^{m}8), 202¾° from the front light, is shown at a height of 78 feet (23^{m}8), from a white, wooden lantern with red roof, on a white, square, concrete tower. The lights, which are *fixed green*, lead in their alignment northwest of Poulier à Gagnon and southeast of Poulier de la Longue Pointe.

Bellerive Park leading lights.—The front light, situated on Saw-tooth wharf No. 3, and approximately 2,560 feet (780^{m}3), 302° from Ile Ronde front leading light, is shown at a height of 53 feet (16^{m}2) from a mast. The rear light, situated 636 feet (193^{m}9), 216½° from the front light, is shown at a height of 90 feet (27^{m}4), from a similar mast. The lights, which are *fixed green*, in their alignment lead northwest of Longueuil Shoal.

Chart 1340.

There is a *flashing white* light, with a directional lens, placed 3 feet (0m9) below the front range light.

St. Mary's Current is the name given to the passage, 1,300 feet (396m2) wide, between Ile Ronde and Montreal, and through which passes the bulk of the St. Lawrence River water. The ordinary rate of the current in this section of the river is 4½ knots.

Caution.—Should two vessels meet in St. Mary's Current, the upbound vessel must stop, and allow the downbound vessel to pass.

Current chart.—A chart entitled "Currents in Montreal Harbour" (No. 1343) is available, showing in detail the direction and velocity of the currents in the harbour from Mackay pier to Racine wharf.

Light and other buoys.—Red light-buoy 174M, showing a *flashing red* light, is moored on the upper end of Longue Pointe Curve and marks the northeastern extremity of Longue Pointe Shoal. Black light-buoys 175M and 177M, marking the northwest edge of Poulier à Gagnon, exhibit *flashing white* lights. The edge of Longueuil Shoal is marked by two black light-buoys, 187M and 193M, showing *flashing white* lights, and a black can buoy 187½M. The edge of Forsyth Shoal is marked by red conical buoys 186M and 188M.

On the southeast edge of the channel at the lower portion of St. Mary's Current is moored black light-buoy 195M, bearing about 289°, distant 1,600 feet (487m7) from Ile Ronde front light. Black light-buoy 199M is moored about 2,000 feet (609m6) above Jacques Cartier bridge, and on the eastern side of the channel; immediately southeastward of it lies a shoal area with a least depth of 5 feet (1m5). Black light-buoy 201M is moored about 206°, distant 2,650 feet (807m7) from Ile Ronde rear light. These three buoys show *flashing white* lights.

Black spar buoys 203M and 205M mark the east side of the channel from the last mentioned buoy to abreast King Edward pier, and a black spar buoy marks the edge of shoal water opposite Alexandra pier. The east side of the berth on the east side of Bickerdike pier is marked by three black spar buoys.

Charts 1338, 1339.

Directions, Sorel to Montreal.—(*For Trois-Rivières to Sorel, see* page 36). From abreast the entrance to Richelieu River, continue on the Ile de Grâce leading line, steering 253¼° for one mile, when gradually haul southward for 1¼ miles, passing 80 yards (73m2) northwest of black light-buoy 1M, steering 195° with the Ile Dupas leading lights in alignment astern. Continue on this course 3¼ miles, thence midway between the banks of the river for 2¼ miles, steering 208°, until nearly abreast black light-buoy 5M, distant 7¾ miles above the mouth of the Richelieu River. Now haul southward, passing black light-buoy 5M and black can buoy 7M, on the port hand, and steer 181¼° for 2·1 miles, passing between red and black buoys, with the St. Ours Channel leading lights in alignment ahead, until abreast red light-buoy 16M.

A vessel should now haul gradually westward in Bellmouth Curve for half a mile, passing 100 yards (91m4) southeast of red light-buoy 20M, and northwestward of the black spar buoys, until abreast black spar buoy 23M. The Petite Traverse Contrecœur leading lights should now be kept in alignment astern, the vessel steering 227° for 1·2 miles, between red light-buoy 26M and two red conical buoys and three black spar buoys, until at Contrecœur Bend. Haul rather sharply southward round black light-buoy 31M, and steer 213° for 2·1 miles, between red and black spar buoys, with the Contrecœur Course

Charts 1339, 1340.

leading lights in alignment astern. The vessel will now be nearly abreast black spar buoy 45M, and should haul southward round it, with Contrecœur Traverse leading lights in alignment ahead, bearing 194¼°.

The latter leading line is kept for only half a mile, when a vessel should gradually haul westward between the spar buoys, until the Verchères-Contrecœur leading lights are in alignment astern, bearing 040¼°. Now steer 220½° for 4½ miles, passing red spar buoy 76M, 80 yards (73m2) to starboard, and black light-buoy 79M, the same distance to port, until close below Ile aux Prunes red light-buoy 82M. Hence a vessel should haul westward with the Verchères Traverse leading lights in alignment astern, bearing 056°, and keep this alignment for a little more than a mile, steering 236°, past black can buoy 87M, until close below black light-buoy 89M. Haul southward round the latter, with Ile Bouchard leading lights in alignment astern, and later the Ile Deslauriers leading lights in alignment ahead, the vessel steering 217½° through the Cap St. Michel-Verchères Channel, 4¼ miles, passing red spar buoys 96M 104M and 116M, black spar 99M, and black light-buoy 103M, until abreast black light-buoy 117M, and red light-buoy 118M, close southwestward, at Cap St. Michel Curve.

From these buoys, haul gradually southward for half a mile until abreast red conical buoy 122M. Pass 100 yards (91m4) east of this and gradually haul westward to bring Ile Ste. Thérèse Lower leading lights into alignment ahead, bearing 218°. Proceed on this alignment two-thirds of a mile, passing southeast of red light-buoy 124M, until abreast black light-buoy 129M. From here, a vessel should haul gradually southward for three-quarters of a mile through Varennes Curve, passing red conical buoys 130M and 132M, 100 yards (91m4) to starboard, black can buoy 131M, and light-buoy 133M, the same distance to port, until Ile à L'Aigle leading lights are in alignment ahead, bearing 183½°. This leading line, kept for half a mile, leads through Varennes Traverse; when 200 yards (182m9) above black can buoy 137M, a vessel should haul westward, and steer 202°, about three-quarters of a mile, passing 80 yards (73m2) northwest of black light-buoy 141M.

Caution.—In Varennes Traverse a current of about 2½ knots sets a little on the starboard bow and must be guarded against.

There being no leading line for Ile Ste. Thérèse Channel, a vessel should keep near the Ile à L'Aigle shore, when above black light-buoy 141M. When abreast the light on Ile aux Vaches, a vessel should haul westward with Ile aux Vaches Traverse leading lights in alignment astern, and steer 215¾°, for half a mile, passing between red conical buoy 148M and black can buoy 147M, until a little below red conical buoy 150M. Pass southeast of this buoy, keeping the Tétreauville leading lights in alignment ahead, and Ile Ste. Thérèse Upper leading lights in alignment astern, steering 204½° for 2¾ miles, between a series of red and black buoys, including black light-buoy 157M, until abreast black light-buoy 163M and red conical buoy 164M. Now haul gradually southward through Longue Pointe Curve, passing 80 yards (73m2) northwest of black can buoy 165M and black light-buoy 167M, and southeast of red conical buoy 166R.

Caution.—In this curve, a vessel will have a current of about 2 knots on her port bow, which should be guarded against.

When abreast black can buoy 169M, a third of a mile above black light-buoy 167M, the Longue Pointe Traverse leading lights should be kept in alignment astern, the vessel steering 169¾° for half a mile, until abreast black light-buoy 171M. A vessel should now haul gradually westward, passing 80 yards (73m2) southeast of red light-buoy 174M, and steer 202¾°, with Ile Ronde

Charts 1339, 1340.

leading lights in alignment ahead, for 1½ miles, passing 160 yards (146m3) northwest of black light-buoy 175M, and 100 yards (91m4) northwest of black light-buoy 177M.

When abreast black light-buoy 187M, haul gradually westward, bringing the Bellerive Park leading lights into alignment ahead, bearing 216½°, and passing one cable northwestward of black light-buoy 193M.

Caution.—In case of two vessels meeting in St. Mary's Current, the upbound vessel must stop and allow the downbound vessel to pass.

Pass northwest of black light-buoy 195M, and when 500 yards (457m2) above this buoy, haul slowly southward and steer 188° under Jacques Cartier bridge, through the southwest portion of St. Mary's Current, to the upper deep water piers, Windmill Basin or Lachine Canal, as requisite. Keep 80 to 100 yards (73m2 to 91m4) from the Montreal wharves or keep black light-buoys 199M and 201M, and the two spar buoys 203M and 205M, well to port, in the upper reaches of the harbour.

Caution.—When abreast Ile Ronde, a vessel will have St. Mary's Current with a rate of 4½ to 5 knots, a little on her port bow, and should guard against it.

CHAPTER V.

OTTAWA RIVER

Chart 1449.

CAUTION—DISTANCES.—To avoid any possible confusion with the system adopted in the United States Government Sailing Directions for the lakes, the distances from Montreal to Kingston are given in statute or land miles of 1,760 yards, eight of which are approximately equivalent to 7 nautical miles of 2,025 yards, as represented on the east and west margins of the chart. The longer distances, however, have the equivalents in nautical miles bracketed with them.

Ottawa River.—This, the largest and principal tributary of the St. Lawrence River enters the latter by several mouths above and below the Island of Montreal. The Ottawa River from its source, which is almost directly north of Ottawa, in the Grand Lake Victoria region, at the height of land which marks the commencement of the slope northward to Hudson Bay, to its junction with the St. Lawrence River at Montreal, is about 750 statute miles in length. It has a drainage basin of 56,043 square miles.

The discharge or flow of the Ottawa River varies largely, but there are no sudden variations, and the freshets occur only once a year, and always at about the same time. In general, the lowest stages occur in September and October, and often continue throughout the winter months, and in the highest stages late in May and June, on account of the late spring at the headwaters.

At the Rideau lock gauges at the city of Ottawa, the record high water occurred in the year 1876 when the level reached to almost 25 feet (7^m6) above the low water record of 1846. Corresponding fluctuations of flow and water-level at other points between Montreal and Ottawa vary according to the location and character of the river.

The country below Ottawa for some miles along the north shore is rich in minerals. Important deposits of mica, opatite, graphite, etc., are found and have been developed.

The Ottawa River is navigable from the St. Lawrence River to Ottawa, canals and locks having been built to overcome the Ste. Anne, Carillon, and Grenville Rapids, and channels dredged where necessary.

The draught available through these canals is about 8 feet (2^m4) at extreme low water (*See* page vi).

Further navigation upstream above the city of Ottawa is obstructed by the Chaudière Falls, but a canal and series of locks commencing at that point lead from Ottawa by way of the Rideau River and lakes for 123½ statute miles through the Province of Ontario to Kingston at the head of the St. Lawrence River and the foot of Lake Ontario.

The normal draught available through the Rideau Canals, locks and shoaler reaches is 5½ feet (1^m6). The number of locks, both ascending and descending on the Rideau Canal system, is forty-seven.

Barge navigation existed on a large scale on the Ottawa River between Montreal and the cities of Ottawa and Hull; at one time from 200 to 350 barges came up to carry lumber from points in the river to Montreal, Quebec, Lake

Chart 1449.

Champlain and other points. The capacity of such barges was about 300 tons. In one year the total freight passing through the Ottawa River canals amounted to 337,850 tons.

Depths given for the Ottawa River are reduced to the sloping surface of the river at extreme low water observed in 1881 and correspond to a depth of 4·5 feet (1m3) of water on the lower mitre sill of the lower entrance lock at the Rideau Canal, and 8·9 feet (2m7) on the upper mitre sill at the upper entrance lock of the Grenville Canal.

For the description of the channel from Dixie front light to Ste. Anne de Bellevue, *see* page 91.

Lake of Two Mountains is an expansion of the lower portion of the Ottawa River, 21 statute miles in length and, in places, 3 miles in width. It is entered from Lake St. Louis by means of the Ste. Anne lock (page 93) above which is a dredged channel marked by spar buoys leading for $1\frac{3}{4}$ miles to abreast of Ile aux Tourtes.

Light-buoy.—The shoal water off the eastern end of Ile aux Tourtes is marked by a black light-buoy, showing a *flashing white* light.

Leading lights.—The upper entrance of Ste. Anne Canal is marked with three leading lights; one 57 feet (17m4) in height on the northeast pier of the canal, and known as upper entrance range front; one 74 feet (22m6) in height on the bank of the canal at the Canadian Pacific Railway bridge, 415 feet (126m5) from the front light, and known as upper entrance range back; and one, 21 feet (6m4) in height, near the head of the embankment on the north side upper entrance to the canal, 625 feet (190m5) from the upper entrance range back; this third light is known as upper range front. All three are *fixed green* lights.

The St. Anne upper entrance leading lights, in one bearing 128°, lead into the canal from Lake of Two Mountains. They should be left on the port hand by downbound vessels when entering the canal.

Main channel into Lake of Two Mountains.—Buoys.—This is marked, in addition to the leading lights, with four red spars, four black spars, two light-buoys, showing *flashing white* lights, and one light-buoy, showing a *flashing red* light.

When bound upstream from the canal and into Lake of Two Mountains, the rear light in line astern with the more westerly and higher of the front lights (upper entrance range front), bearing 128°, leads from the canal entrance upstream until the red and black horizontal-striped light-buoy at the turn into Vaudreuil Bay is passed, when the course should be altered about 20° to the northward, until the more easterly and lower front light (upper range-front) is brought on astern in line with rear light. These two latter lights should then be kept in line astern past Ile Cadieux light.

Vaudreuil Bay is the southern end of Lake of Two Mountains. It is mostly shallow and dotted with small islands. A channel dredged to 6 feet (1m8), and marked with seven red spar buoys, leads from the junction with the main channel, at the red and black light-buoy, southwestward to the wharf at the village of **Vaudreuil** *(Lat. 45° 24′ N., Long. 74° 02′ W.)*. The Government wharf has a pierhead 64 feet (19m5) in length and along the face is a depth of 8 feet (2m4). From the southern end of Vaudreuil Bay, the Vaudreuil mouth of the Ottawa River runs southward west of Ile Perrot into Lake St. Louis. It is crossed by a bridge of the main highway to Montreal and the two bridges of the Canadian National and the Canadian Pacific Railways.

Chart 1449.

Close south of the bridges this outlet to the St. Lawrence is blocked by rapids and is navigable only for small boats and canoes.

From the Vaudreuil Village Channel, a dredged channel, with 9 feet (2m7) of water and marked by two black spar buoys, leads to the former wharf of the Standard Explosive Company, near the east end of the railway bridge on the northwest shore of Ile Perrot.

Vaudreuil Station (formerly known as Dorion) is a village on the west shore of the Vaudreuil mouth of the Ottawa River, where the bridges cross from Ile Perrot.

The shores of Vaudreuil Bay are dotted with cottages and summer residences.

Rivière des Prairies.—The eastern arm of Lake of Two Mountains is mostly shoal, with about 5 feet (1m5) of water. Two branches of the Ottawa River flow eastward from it, one Rivière des Prairies, between the Island of Montreal on the south and Ile Bizard and Isle Jésus on the north. At the head of Rivière des Prairies are the **Cap St. Jacques Rapids** and 6 miles downstream eastward of Ile Bigras, the **White Horse Rapids.** Eight miles farther down, the **Sault au Recollet Rapids** at Bordeaux and some power dams completely obstruct further navigation eastward. Along this stretch are located the villages of **Bord à Plouffe, Cartierville** and **Bordeaux,** and a mile east of the latter are **Pont Viau** and **Ahuntsic.** Railway bridges cross the stream at White Horse Rapids and at Bordeaux, and highway bridges at Cartierville and Pont Viau.

A narrow channel at the northern end of Ile Bizard, in which are located Dutchman Rapids, also connects the east end of Lake of Two Mountains with Rivière des Prairies.

Rivière des Prairies has its eastern end at the junction with the St. Lawrence River at Bout de l'Ile, the northern end of Montreal Island.

Rivière des Milles Iles, the third outlet of the Ottawa River, flows out of Lake of Two Mountains at its eastern end one mile north of the Dutchman Rapids. Two miles downstream, at the mouth of **Rivière du Chêne,** a small tributary of Rivière des Milles Iles, is the village of **St. Eustache,** where a highway bridge crosses the main stream.

Channel.—Buoys.—Sixteen spar buoys, 14 red and 2 black, mark a 5-foot (1m5) channel through the eastern arm of Lake of Two Mountains; this channel leads from a point about three-quarters of a mile northeastward of **La Barque,** into the narrow passage at the northern end of Ile Bizard.

Ile Cadieux.—Lights.—Three miles above St. Anne lock is Ile Cadieux, projecting from the west shore of Lake of Two Mountains. On its extreme northeastern point are two *fixed white* lights, shown from lanterns on the top of cylindrical tanks at heights of 21 and 12 feet (6m4 and 3m7). The lights are unwatched and the eastern light shows over the western one. The steamer track passes a quarter of a mile off the lights, and thence leads northwestward toward Oka Point light and wharf, distant 3½ miles on the north shore.

Light-buoy.—A red light-buoy, showing a *flashing red* light, is moored one cable southwest of a 6-foot (1m8) patch, lying four-fifths of a mile northwest of Ile Cadieux light. On the south side of the channel, abreast this buoy, is moored a black spar buoy, marking the north extreme of the shorebank.

Chart 1449

The lake narrows to a width of one mile at a distance of a mile below Oka, between two projecting points—**Pointe Cavagnal** on the south and **Pointe aux Bleuets** on the north shore, the former having a wharf with about 5 feet (1m5) of water. A submerged pipe line crosses the river between the above two points.

Buoys.—About 3 miles eastward of Pointe aux Bleuets is a small dry reef called Le Petit Rocher. Between this reef and the north shore are a number of submerged wrecks, marked by green spar buoys. About half-a-mile northward of the reef, at the entrance to La Grande Baie, is another wreck marked by a similar buoy.

Oka is a village on the north shore, 7½ miles from Ste. Anne lock. It has a Government wharf with a depth of about 8 feet (2m4) at the outer end. Forty feet (12m2) from the west side of the wharf is a basin, 200 feet (61m0) long and 50 feet (15m2) wide, which was dredged in 1950 to a depth of 5½ feet (1m6). Close by the wharf is a prominent church. A road leads to a Trappist monastery at La Trappe, high up in the hills, 3 miles northeastward of the wharf.

Light.—On the outer end of Oka wharf there is a *fixed light,* 26 feet (7m9) high, which shows *red* to eastward and *white* to westward, and is visible from all points of approach by water.

Abreast of Oka, and on the south shore of the lake, is a station of the Canadian Pacific Railway. A channel dredged to 5 feet (1m5) leads to the landing.

Como wharf lies on the south shore, a little above and a mile across from Oka, with 5 or 6 feet (1m5 or 1m8) of water at it.

Hudson Village *(Lat. 45° 28′ N., Long. 74° 08′ W.),* on the south side of the river about 2 miles above Oka, has a Government wharf with a face of 100 feet (30m5) in length; at the face is a depth of 8½ feet (2m5). Close west of the wharf is a Government breakwater, extending 180 feet (54m9) easterly and thence 100 feet (30m5) southerly, forming a protected basin with depths of 4 to 7 feet (1m2 to 2m1); alongside the southerly portion there is a depth of 7½ to 9 feet (2m3 to 2m7) on the outside. Hudson is a station on the Canadian Pacific Railway. Extending for a mile and a half up the shore is the summer resort of **Hudson Heights.** The hills behind rise to about 250 feet (76m2).

Buoys.—The upstream channel, from the wharf to the main channel, is marked by a black spar buoy, and three other black spar buoys are moored on the south side of the channel between Hudson and Corbeau Shoal.

Pointe du Lac.—Light.—On the north shore, one and a half miles above Oka wharf and opposite Hudson Village, there is a light on the top of a hill a short distance back from the water. It is *fixed white,* 156 feet (47m5) high. It is also known as **Oka light** and with Pointe aux Anglais light, farther upstream, forms a range, bearing 121½°, which leads through the main channel above the latter point. Between Pointe du Lac and **Parsons Point,** on the opposite shore, the lake is less than a half mile in width.

Pointe aux Anglais, on the north shore, 4¼ miles above Oka wharf, has a landing wharf and a channel leading into it from the main channel of the lake.

Chart 1449.

Leading lights.—On steel cylindrical tanks, located about 400 yards (365^{m}8) off Pointe aux Anglais, two *fixed white* lights are shown at an elevation of 30 feet (9^{m}1) for the eastern and 33 feet (10^{m}1) for the western. The western of these lights and Oka light (Pointe du Lac) in line astern, bearing 121½°, lead up from a turn in the channel one mile above Pointe aux Anglais for 2¼ miles to the intersection of their alignment with that of the Carillon Bay leading lights.

Light-buoy.—A red light-buoy, showing a *flashing red* light, is moored 500 feet (152^{m}4) southwest of Pointe aux Anglais lighthouse.

Corbeau Shoal, stony, with 2 feet (0^{m}6) of water, lies in the middle of the lake, about a mile below Pointe aux Anglais light. It is marked with a black spar buoy and the main channel passes northward of it.

From Oka to above Pointe aux Anglais, the steamer channel follows the middle of the lake in deep water.

Graham Point lies on the south shore 2¼ miles southwestward of Pointe aux Anglais. Just east of the point is situated Choisy Landing wharf. A buoyed channel leads from the deep water of the lake across the flats to the wharf. **Choisy** is a station on the Canadian Pacific Railway.

Immediately above Pointe aux Anglais and Graham Point, the lake expands to a width of about 3½ miles. It is shoal for the most part, with one to 3 feet (0^{m}3 to 0^{m}9) on the flats, but a deep water channel continues up the middle. About a mile above Graham Point is **Pointe à la Raquette** *(Lat. 45° 30′ N., Long. 74° 15′ W.),* where the **Rivière à la Raquette,** a small stream, enters the lake.

St. Placide is a village on the north shore of this expansion 2¼ miles above Pointe aux Anglais. It has a landing wharf. From a point in the main channel a mile above Pointe aux Anglais, a buoyed channel leads northwestward into St. Placide wharf.

A second and similar channel, dredged and buoyed, leads from upstream to the wharf.

Pointe à Masson is a slight projection of the north shore a mile above St. Placide.

Carillon Island, 2½ miles in length and three-quarters of a mile in width, occupies the extreme western end of Lake of Two Mountains, 2 miles above St. Placide. There is a channel both north and south of it. The northern channel is followed by continuing on the line of the Pointe aux Anglais and Oka lights, bearing 121½°, to the intersection of their alignment, at a point in the channel north of the east end of Carillon Island, with the alignment of the Carillon Bay leading lights. The channel then follows close to the north shore of the island to its junction with the south channel at the west end of the island.

The south channel is reached, across the flats, by a buoyed channel which is a continuation, south of the main channel, of the upstream channel to St. Placide wharf. Then the south channel flows in midstream between Carillon Island and the south mainland shore.

Carillon Bay leading lights.—Two leading lights, *fixed white,* are shown, at elevations of 41 and 65 feet (12^{m}5 to 19^{m}8), from masts with white diamond-shaped daymarks, erected on the mainland north of the middle of Carillon Island; the lights in line, bearing 285°, lead through the north channel as already described.

Chart 1449.

On the northeast point of Jones Island, another *fixed white* light is shown, at an elevation of 24 feet (7m3), from a similar structure with a white shed at its base; this light in line with the front light of Carillon Bay leading lights, bearing 051°, leads southwestward through the narrow part of the north channel and past the west end of Carillion Island into the main river.

Light-buoy.—On the south side of the channel, at the intersection of Pointe aux Anglais-Oka Point and Carillon Bay ranges, is moored a black light-buoy, showing a *flashing white* light.

Buoys.—A rocky shoal, with less than 6 feet (1m8) of water over it, lies on the north side of the channel just below the lower end of Jones Island. The south side of this shoal is marked by two red spar buoys and a red light-buoy, showing a *flashing red* light, the latter being the westernmost of the three. Two black spar buoys, moored abreast the upper end of Carillon Island, mark the south side of the channel.

Rivière Rigaud enters the Ottawa on the south side opposite the upper end of Carillon Island. A red spar buoy, marking a rocky shoal, is moored on the west side of the entrance channel at its outer end; the channel in the river, for some distance up, is buoyed. Pointe au Sable is the eastern entrance point of the river.

Rigaud Town is on the Rivière Rigaud, 2 miles above the mouth, and is a station on the Canadian Pacific Railway.

From just above the head of Carillon Island, at the west end of Lake of Two Mountains, the Ottawa River narrows to a third of a mile in width and continues thus for 4¼ miles to the Carillon Canal. The steamer channel is in midstream, until within a mile of the canal, where the course lies closer to the northeast bank past **Weirs Shoal,** with 6 feet (1m8) of water on it, lying in the middle of the river.

Buoys.—On each end of Weirs Shoal is moored a red and black horizontally-striped spar buoy.

St. Andrews East *(Lat. 45° 34′ N., Long. 74° 20′ W.)*—Three and a half miles below the Carillon lock, the Rivière du Nord flows into the Ottawa River from the north shore. It has a buoyed channel leading into and up for about 2½ miles to the town of St. Andrews East. The latter is a station on the Canadian National Railways to Montreal. About half-way between the mouth and St. Andrews East is a Government wharf on each side of the river, each 30 feet (9m1) long parallel to the stream, with a depth of 8 feet (2m4) along the face.

Carillon Canal.—The lower entrance of the Carillon Canal is, by the steamer channel, 15¾ miles from Oka, and 22½ miles from Ste. Anne lock. The canal is 0·94 statute mile in length and overcomes the Carillon Rapids. It has two locks. The lower, No. 1, is 202 feet 3 inches (61m6) in length, 45 feet (13m7) minimum width, with a normal depth of 9 feet (2m7) of water over the sill. This lock has a lift of 10½ feet (3m1).

The upper lock, No. 2, has a length of 200 feet 9 inches (61m3), a minimum width of 45 feet (13m7), with a normal depth of 9½ feet (2m8) over the sill. The lowest recorded depth for this sill is 8·17 feet (2m4). This lock has a lift of 3½ feet (1m0).

Light.—A *fixed red* light is shown at the end of the point at the lower entrance of the canal. This light must be left to port when entering the canal.

Chart 1449.

Wharf.—At the village of Carillon is a wharf 270 feet (82m3) long and 43 feet (13m1) wide, with a depth of 10 feet (3m0) at the outer end; it is located about 900 feet (274m3) below the canal lock.

Chart 1541. 5

Pointe Fortune, a station on the Canadian Pacific Railway, is a village on the south shore across from Carillon Village. There are ferry landing wharves at both places.

An overhead transmission line, with a minimum clearance of 75 feet (22m9), crosses the river in the vicinity of Pointe Fortune. 10

Buoy.—A shoal, with a rock awash on its upper end, lies in midstream between Carillon and Pointe Fortune. On the east end of this shoal, in midstream, is moored a steel taper buoy painted in red and black horizontal stripes.

Three-quarters of a mile above the lower entrance of the canal, a dam extends across the rapids, which raises the water in the river above the Carillon 15 Rapids to about 9 feet (2m7) over its former natural level, enabling the river above that point to be used for navigation. (Note.—Due to a break in this dam in 1948, the available draught between Carillon and the foot of the Grenville Canal is now less than normal and may eventually be reduced to 6 feet (1m8.)

Lock No. 2 or Carillon Canal upper entrance is half a mile above the lower 20 lock No. 1 and opposite the dam.

Leading lights.—Two *fixed white* leading lights are exhibited, at elevations of 27 and 48 feet (8m2 and 14m6), from lanterns on white open framework towers on the north bank of the canal near the upper gate of lock No. 2. In line, they lead from the canal and south of Dewar's Island; two day beacons on the south 25 shore form a reciprocal alignment.

Dewar's Island lies near the north shore of the river, a quarter of a mile above the upper entrance to the canal, and the main channel is south of the island and on the line of the canal entrance leading lights. A third of a mile above Dewar's Island is the upper entrance of the old canal, now no longer used. 30

Buoys.—Two black spar buoys mark the channel at Dewar's Island. One is moored southwestward of the upper end and the other abreast the middle of the island. Two black spar buoys mark the north faces of the two westernmost piers at the upper entrance of the canal. The two piers have been dismantled to water level. 35

From the head of Carillon Canal to Greece Point, a distance of about 6 miles, there is unobstructed navigation.

Chûte à Blondeau is a narrow curving reach of the river extending from Cushing on the north shore, situated $4\frac{3}{4}$ miles above Carillon to the Grenville Canal lower entrance. There was formerly a rapid at Chûte à Blondeau, which 40 was drowned out by the rising of the level of the river at the Carillon dam.

Chûte à Blondeau *(Lat. 45° 35′ N., Long. 74° 82′ W.)* is a small village on the south shore, $1\frac{1}{2}$ miles below Greece Point. There is a Government wharf 99 feet (30m2) long, parallel to the stream, with a depth of 6 feet along the face. 45

On the north shore, inside the small island in Chûte à Blondeau, is the site of an old lock which in earlier years assisted vessels past rapids.

Chart 1541.

Leading lights.—*Fixed white* leading lights, known as Chûte à Blondeau lights, lead through the narrow channel to Greece Point. The front light is shown at an elevation of 23 feet (7^{m}0), from a white square structure with a red roof on the west end of the small island mentioned above; the rear light is shown, at an elevation of 43 feet (13^{m}1), from a red square skeleton tower with white enclosed upper part and red-roofed lantern, located on the north shore, 1,214 feet (370^{m}0) eastward of the rear light, close by the old lock. The rear light is also visible downstream.

Two *fixed white* leading lights are exhibited at Greece Point. The front light is exhibited, at an elevation of 50 feet (15^{m}2), from a white, steel skeleton tower. The rear light is exhibited at an elevation of 75 feet (22^{m}9), from a similar tower, 487 feet (148^{m}4), 281°, from the front light.

Buoy.—A red can buoy is moored on the southern side of the river at the western end of Chûte-à-Blondeau.

Grenville Canal.—This canal, by which the Long Sault Rapids are avoided, is about 56 miles below the city of Ottawa. The canal is a little over 5 nautical miles (5·94 statute) in length. It has five locks, each 200 feet (61^{m}0) in length and 45 feet (13^{m}7) in width. The depth of water over the sills is 9 feet 6 inches (2^{m}8). The minimum depth provided for vessels passing through both the Carillon and Grenville Canals is 9 feet (2^{m}7), except during periods of very low water.

Like the Carillon Canal, the Grenville Canal is on the north side of the river, its lower entrance, where is located lock No. 3, being at Greece Point. The total lockage in this canal is 43 feet (13^{m}1).

Light.—There is a *fixed red* light at the outer end of the south entrance pier.

Just below the entrance is a ferry wharf for communication with the south shore of the river. There are a number of islands in the Long Sault Rapids, the largest being **Stevens Island,** near the lower end.

Lock No. 4 is 1,200 feet (365^{m}8) above the entrance lock, and No. 5, three-quarters of a mile farther up, at the village of **Stonefield.** Lock No. 7 is at the upper entrance and No. 6 over one mile below the latter.

Bridges.—A railway bridge of the Canadian National Railways crosses the river and the canal a quarter of a mile above lock No. 6 and a highway bridge is located one-third of a mile farther upstream. The minimum overhead clearance is 42 feet (12^{m}8).

Grenville Village *(Lat. 45° 38′ N., Long. 74° 36′ W.)* is on the north shore at the upper entrance to the canal. The wharf near the mill of Dansereau & Fils is 655 feet (199^{m}7) in length and about 56 feet (17^{m}1) wide. The depth on the north side, at the outer end, and in a berth 100 feet (30^{m}5) long on the south side, is 8 feet (2^{m}4) (1947).

Leading lights.—Two *fixed red* leading lights, erected on the west side of the canal at its upper entrance, in line, bearing 171°, lead from the canal entrance and east of the large shoal in the middle of the river, for two-thirds of a mile. The lights are shown from masts with diamond-shaped daymarks, at elevations of 32 and 46 feet (9^{m}8 and 14^{m}0).

Light-buoy.—A black light-buoy, showing a *flashing green* light, is moored 2,500 feet (762^{m}0) above the entrance to the canal, on the north end of the shoal in the middle of the river.

Chart 1541

Hawkesbury, a flourishing town on the south shore of the Ottawa River, opposite Grenville, is the largest town between the cities of Ottawa and Montreal. It had a population of 7,152 in 1951, and has important lumbering and pulp and paper industries. Its mills are visible for a considerable distance both up and down the river. Some of the mills are located on **Great** or **Large Island** lying close to the mainland shore.

There are landing wharves at Hawkesbury reached by an approach channel marked by spar buoys from the main channel of the river. At the wharf of the International Paper Co., there is a depth of 6 feet (1m8).

From Grenville to the foot of the Rideau Canal locks at the city of Ottawa, a distance of 51¾ (59½ statute) miles by the centre line of the channel, there is unobstructed river navigation.

The Kingham River, a small stream, enters the Ottawa River just above Grenville.

Calumet is a village on the Canadian Pacific Railway on the north shore, 2½ miles above Grenville. The river here is about 2,000 feet (609m6) in width and the north shore is indented by some shallow swampy bays, known as **Calumet, Pumpkin Seed** and **C.P.R. Bays.** An old railway wharf with a spur line was at one time located in C.P.R. Bay.

Just above Calumet, a transmission line, with a clearance of 60 feet (18m3) at high water, crosses the river. A submarine cable is laid across the river close eastward of the transmission line.

Just above this narrow reach of the Ottawa River, the river widens into an expansion 1½ miles in width, known as **L'Orignal Bay,** about 6 miles in length.

The village of **L'Orignal** is on the south shore near the eastern end of this expansion and is distant 4½ miles from Grenville. A wharf, partly in ruins, extends 2 cables northward from the village.

Leading lights.—Furniss Point is half a mile above L'Orignal Village, and on it are shown *fixed white* leading lights, at elevations of 18 and 23 feet (5m5 and 7m0), from white square buildings. These lights in line lead from abreast this village nearly to Calumet Village.

Pointe au Chêne *(Lat. 45° 38′ N. Long. 74° 45′ W.)* is a village on the north shore on the line of the Canadian Pacific Railway, 2½ miles above L'Orignal. Half a mile below the village is the mouth of **Ruis Pointe au Chêne** and on the sandy west point of the creek is an abandoned lighthouse, which is left standing as a daymark. About 2¼ miles eastward from Ruis Pointe au Chêne is the Rivière Rouge, the entrance to which is blocked by extensive sand flats.

Azatika Bay is a shallow arm on the south shore, at the west end of L'Orignal Bay expansion. Into it flows **Deselicaux Brook.** Here the river again narrows to about 2,000 feet (609m6), maintaining this width for about 10 miles to Grande Presqu'ile and Papineauville.

Leading lights.—Near the lower end of this narrow reach, and 2¾ miles above Pointe au Chêne, is **McTavish Point** at the mouth of Little Kinonge Creek on the north shore. The front light is shown at an elevation of 20 feet, (6m1), from a white square structure with a red-roofed lantern, on the extremity of the point. The rear light, located 2,408 feet (734m0), 279°, from the front, is shown, at an elevation of 64 feet (19m5), from a white diamond-shaped daymark with a black vertical stripe, on a pole with a small white shed at its base. The lights are *fixed white.*

Chart 1541.

Fassett is a village on the north shore about 2½ miles above McTavish Point light. There is a Government wharf at the village. Two miles farther upstream on the south side is the village of **Lefaivre.** On the opposite shore, and about half a mile westward, is the mouth of **Kinonge River. Montébello** Town on the north shore with a landing wharf, 90 feet (27m4) long, lies a little over 2 miles above Lefaivre and distant 13 statute miles from Grenville Canal.

Just above Montébello, the Ottawa River north shore is deeply indented with long, shallow bays, whose lengths are parallel to the main stream, forming **Grande Presqu'île, Petite Presqu'île, Aronsen Island** and **Baie Arcand.** The main navigable channel is south of the islands and points, and follows fairly close to the south shore of the river. Aronsen and another smaller island are at the east or lower entrance to **Baie de la Pentecôte,** the latter being enclosed by Grande and Petite Presqu'île and the north shore. On this north shore of the bay is Papineauville Village.

The **Seigniory Club** is a resort on the north shore of the Ottawa River, just above Montébello, embracing 80,000 acres of land and with a log chateau of 225 rooms. The mud flat, that formerly lay in front of the chateau, has been removed by dredging below low water level and a basin has been dredged to provide anchorage for pleasure craft, with depth sufficient to accommodate anything that can pass the locks at Carillon. On the north side of the basin, a wharf has been built for the accommodation of guests' launches and yachts.

Light.—At Montébello, the Ottawa River curves somewhat sharply to the southward and close to the south bank, across from and about half a mile above Montébello, is a small islet, **Ste. Rosalie Island,** on which is erected a white, square, wooden building with a lantern and red roof. The light, *fixed green,* is 32 feet, (9m8) high and visible in the channel both up and down stream.

Between the small island just above Aronsen Island and the east extremity of Presqu'île, a narrow channel was dredged to a depth of 12 feet (3m7) at low water leading northward into Baie de la Pentecôte. It is marked by spar buoys.

Papineauville *(Lat. 45° 37′ N. Long. 75° 00′ W.)* is a station on the Canadian Pacific Railway. There are sawmills, a foundry, boiler works, and a mica factory located here.

From Montébello up to East Templeton, the north shore of the Ottawa River is an alluvial flat about a mile wide, bordering a steep slope which has formed the ancient bank of the river. These flats are formed by the silt carried down by tributary streams—the Gatineau, the Lièvre, the Blanche at Thurso, and the Petite Nation at Plaisance. The flats are intersected by long bays, parallel to the main river, and are popular shooting grounds. During high water periods in May and June the flats and portions of the neighbouring lowlands are covered.

Portions of the south shore are also submerged in like manner, notably below Wendover, at the mouth of the South Nation River, and above and below the town of Rockland.

Between Ottawa and Hawkesbury, during the May and June flow, the river has a difference in level or slope of 5 feet (1m5). In consequence the current is greater during this period than in midsummer and the autumn.

Treadwell, on the south side of the river opposite Papineauville, is a small village with a wharf 150 feet (45m7) long.

Chabot, a small village on the lower end of Grande Presqu'île has a small wharf.

Charts 1541, 1542.

For 3 miles above Treadwell, the river is narrow, contracting to about 1,000 feet (304^{m}8) width for the upper mile of this section.

South Nation River enters the Ottawa River on the south side, 4½ miles about Treadwell. It is navigable for 2 miles. On the north side of the Ottawa River, opposite the mouth of this stream, is **Rivière Petite Nation.**

Plaisance Village is situated at the head of Baie de la Pentecôte.

Black Bay, a long, narrow, shallow bay of no importance, lies on the north side of the Ottawa River just above Rivière Petite Nation.

Wendover, about a mile above the mouth of the South Nation River, has a Government wharf 108 feet (32^{m}9) long with about 9 feet (2^{m}7) of water along the face. In 1955, it was in ruins. The church steeple is a conspicuous mark from the river.

Leading lights.—About 3,830 feet (1,167^{m}3), 246°, from the outer end of the Government wharf, the front light is shown, at an elevation of 52 feet (15^{m}8), from a white slatwork daymark on a pole, with a white shed at its base. The rear light is shown, at an elevation of 105 feet (32^{m}0), from a steel skeleton tower with a white slatted daymark, 1,700 feet (518^{m}2), 246°, from the front light.

Chart 1542.

Thurso Islands light.—A mile above Wendover is the lower end of a group of seven thickly-wooded islands that extend about 2 miles upstream. The largest of the group are **Ile Dubé** and **Ile Fer-à-cheval,** and the steamer channel lies between the small islands lying west and east, respectively, of these two islands. The extreme width of this channel is only 700 feet (213^{m}4) and the navigable portion, owing to banks making out from both shores opposite the lower end of the island southwest of the channel, is restricted to 400 feet (121^{m}9). It is possible, however, to carry 10 feet (3^{m}0) through here at the extreme low water stage of the river, corresponding to 9 feet (2^{m}7) on the upper mitre sill of the upper entrance lock of the Grenville Canal. On the north shore of the river, 5 miles below Thurso Village, a light, *flashing white,* leads up the channel between the two islands mentioned above.

Thurso Village, on the north shore of the river, had in 1951 a population of 1,933. It is a station on the Canadian Pacific Railway and has a wharf with 112 feet (34^{m}1) frontage and a depth of 8 feet (2^{m}4) alongside. A ferry plies between Thurso and a point on the south shore.

Three islands lie in the river abreast and just below Thurso, the two largest being **Clarence** and **Parker Islands.**

Clarence Village is half a mile above Thurso on the south side of the river.

Rockland, on the south side of the Ottawa, is 4 miles above Thurso. The wharf of the International Paper Company has a frontage of 100 feet (30^{m}5), with a depth of 3 feet (0^{m}9) along the face. A ferry plies from Rockland to Lochaber Bay on the north shore. Adjoining Rockland is the village of **Rockland East.**

Lochaber Bay, on the bay of the same name, is a station on the Canadian Pacific Railway, opposite Rockland.

Gardipy Island is a long, low island lying just west of Rockland between **La Fontaine Bay** and the main channel of the Ottawa.

Chart 1542.

Cumberland *(Lat. 45° 31′ N., Long. 75° 24′ W.)*, on the south side of the river, 5 miles above Rockland, has a wharf 90 feet (27m4) long with a depth of about 7 feet (2m1) along the face.

Ferry.—A ferry plies between Cumberland and Masson wharf.

Masson on the Rivière du Lièvre, about a mile from its mouth, had, in 1951, a population of 1,475. The wharf on the Ottawa River has a frontage of 90 feet (27m4). The station on the Canadian Pacific Railway is known as **Buckingham Junction,** and a branch line 4 miles long connects this place with Buckingham.

Rivière du Lièvre enters the Ottawa River, on the north side, about a mile above Cumberland. A highway and a railway bridge cross the river at Masson, and a short distance below these is a dam; another highway bridge crosses at Buckingham and about a mile above Masson is another dam.

Angers is a station on the Canadian Pacific Railway on the north shore of the Ottawa River, 4 miles west of Masson.

O'Connor Island, on the south side of the Ottawa River, extends upstream from abreast Angers for 2 miles. On the north side of it, a sandbar, dry at low stages of the river, extends half-way across the river from the south shore. Another sandbar, also dry at low stages of the river, lies about a quarter of a mile west of the above sandbar.

Way Shoal leading lights.—On the north bank of the river, 1·7 miles below the mouth of Blanche River, two white masts with white diamond-shaped daymarks show *fixed white* lights which, in alignment, mark a channel across Way Shoal used for towing logs. These lights are in operation during the low stages of the river only, for a period probably three months of each year.

Way Channel leading lights.—On the north bank of the river, one-quarter of a mile below the mouth of the Blanche River, two white masts with white diamond-shaped daymarks exhibit, at elevations of 29 and 49 feet (8m8 and 14m9), *fixed white* lights,, which in alignment, bearing 247°, lead between Way Shoal and the north shore to a point nearly abeam of the front light of Besserer Crossing range, when the alignment should be left on the starboard hand to swing gradually into the alignment of Besserer Crossing leading lights.

Besserer Crossing leading lights.—On the north side of the Ottawa River, one-half mile below Blanche River, two white masts with white diamond-shaped daymarks exhibit, at elevation of 29 and 49 feet (8m8 and 14m9), *fixed white* lights, which in alignment, bearing 037½°, lead through the channel across the head of Way Shoal, from deep water on the south side of the river to a point abeam of the front light of Way Channel range.

Blanche River and **Little Blanche River** are small streams 3 miles and 1½ miles, respectively, above Angers on the north side of the river.

McLaurin Lake *(Lat. 45° 29′ N. Long. 75° 35′ W.)*, a long narrow basin parellel to the river, lies just west of Rivière Blanche.

A large sandbar, dry at low stages of the river, extending half-way across from the north shore of the river lies abreast McLaurin Lake.

East Templeton, a small village, with a wharf in ruins, is situated on the north shore 6 miles above Angers.

Chart 1542.

Upper Duck and **Lower Duck Islands** lie on the south side of the river abreast East Templeton. A sandbar, dry at low stages of the river, extends 1,000 feet (304^{m}8) to the westward and 1,000 feet (304^{m}8) north from the upper end of Upper Duck Island.

Green Shoal lies one-quarter of a mile northward of the eastern end of Upper Duck Island.

Light.—A *fixed white* light is exhibited, at an elevation of 38 feet (11^{m}6), from a white, square structure on a pier, on the south side of the channel, opposite Green Shoal.

Mariners, navigating in the vicinity of Green Shoal, are cautioned that due to the concentration of water above the power dam on the Gatineau River and on the Ottawa River each Sunday, there is liable to be a decrease in the depth of water in this vicinity.

Buoys.—Two red spar buoys, and a black spar buoy, mark the channel opposite the east end of Lower Duck Island. Just above and below Green Shoal, the channel is marked by one black and three red spar buoys. Two red spar buoys and a black spar buoy mark the channel off the ruined wharf at East Templeton.

Gatineau, 2½ miles above East Templeton on the north side of the river, is a station on the Canadian Pacific Railway. In 1951, the population was 5,765. A large mill of the Canadian International Paper Company is located here with two wharves, one with a frontage of 200 feet (61^{m}0). A buoyed channel 5,200 feet (1,585^{m}0) long and 100 feet (30^{m}5) wide, with a limiting depth of 3 feet (0^{m}9), extends from deep water just below Kettle Island to the wharf at Gatineau.

Piers.—Just above the entrance, and 200 feet (61^{m}0) below the lower end of Kettle Island, there is a pier on the south edge of the channel. A submerged pier, close south of the channel, lies 300 feet (91^{m}4) above the lower end of Kettle Island, and another submerged pier is located 175 feet (53^{m}3) south of the latter pier.

Buoys.—The submerged piers and crib are marked by buoys.

Kettle Island, 2¼ miles long, lies abreast of Gatineau. The buoyed steamer channel is to the south of this island. Two wrecks, marked by green spar buoys, lie close off the southwestern end of the island.

Gatineau River enters the Ottawa 2 miles below the Interprovincial or Alexandra bridge at Ottawa. A highway bridge crosses the river near its mouth, and the Canadian Pacific Railway bridge is about 1¼ miles farther upstream. The Canadian International Paper Company has large power developments on the river.

Gatineau Point Village, located on the east side of the Gatineau River at its mouth, has a landing wharf.

Rideau River, a shallow stream, enters the Ottawa River, over the Rideau Falls, one mile below the Alexandra bridge.

OTTAWA, Capital of the Dominion of Canada, at the head of navigation on this section of the Ottawa River is 100½ (119½ statute) miles from Montreal. It had a population of 202,045 in 1951. Supplies of all kinds can be obtained and repairs made. It is the northern terminus of the Rideau Canal, by which route the distance to Kingston is 107·2 (123·5 statute) miles.

Chart 1542.

Highway No. 17 runs parallel and close to the south shore of the Ottawa River between Ottawa and Montreal. A bus service is maintained between these cities over this highway, serving all the villages on this side of the Ottawa River. Highway No. 8 between the same two cities, lies on the north shore of the Ottawa close to the river.

Hull, on the north side opposite Ottawa, had, in 1951, a population of 43,483. The city has several large plants for the manufacture of paper, lumber, matches, etc.

Wharf.—There is a wharf at Hull, immediately below the Alexandra bridge, extending 460 feet (140^{m}2) from shore. It has a three-level landing head, 130 feet (39^{m}6) wide, with a depth of 13 feet (4^{m}0) alongside.

CHAPTER VI

MONTREAL TO CORNWALL

Lachine Canal.—It is entered at the Montreal end by either of two locks, side by side, situated a quarter of a mile southwest from the outer end of the Alexandra pier, and known as north and south locks, the former built on the Montreal and the south lock on the Windmill Point side. The lockage, or difference of level between the water at Montreal and that of Lake St. Louis, is $46\frac{1}{4}$ feet (14^m1). (For details of canal *see* page xxxii).

Signal lights.—At the lower entrance to each of the two No. 1 locks is a signal showing *red, flashing amber* and *green* lights. A *red* light or no light indicates that approaching vessels shall keep clear of the entrance. A *flashing amber* light in conjunction with a *red* light indicates that the lock is being prepared to receive an upbound vessel. A *green* light indicates that the lock is ready to receive a vessel.

Two *red-green* traffic signal lights are situated on the centre pier above Lock No. 2; there is also a traffic signal light at the C.N.R. bridge crossing at St. Henri.

The stem of any vessel shall not pass the sign "Limit of Approach" erected on the north end of the pier between the locks until the signal light for the lock to be entered shows *green.*

Laprairie.—From St. Lambert, the southeast shore of the St. Lawrence River trends southerly for $5\frac{1}{4}$ miles to the town of Laprairie, which, in 1951, had a population of 4,065. Here the river has a breadth of $4\frac{1}{2}$ miles. Laprairie is a station of the Canadian National Railways.

Wharf.—At **Cote Ste. Catherine,** 3 miles above Laprairie, is a wharf with a face 85 feet (25^m9) long. The depth alongside is 7 feet (2^m1).

Lachine Rapids.—From Laprairie, the shore of this lake expanse of the river gradually curves westward for $4\frac{1}{3}$ miles to the lower end of Lachine Rapids, which prevent all upward navigation. In these rapids lies **Ile aux Herons. Nuns Island,** $1\frac{1}{2}$ miles long northeast and southwest, is situated close to the Montreal side $1\frac{3}{4}$ miles farther down the St. Lawrence River, with its northeast extremity three-quarters of a mile above Victoria bridge. From the latter, the southeast coast of Montreal Island trends southwest 6 miles to the intake of the Montreal waterworks viaduct, and, thence, the coast of the island runs northwest, $3\frac{1}{2}$ miles, to the upper, or Lake St. Louis entrance of Lachine Canal.

Chart 1450.

Buoys.—The channel, from Lachine Canal to the head of Lachine Rapids, is marked by a red spar buoy, moored 2,000 feet (609^m6) southwestward of Lachine front leading light, and a black spar buoy on the east end of Champlain Shoal.

Caughnawaga *(Lat. 45° 25′ N. Long. 73° 41′ W.)*—From abreast Ile aux Herons, the south shore of the St. Lawrence River trends, northwesterly with an inward curve, 4 miles to the Indian village and reservation of Caughnawaga.

Chart 1450.

Ile au Diable lies half a mile southwest of Ile aux Herons, and, half a mile westward of Ile au Diable, the river narrows to a width of half a mile. Caughnawaga church is conspicuous from Lake St. Louis.

Bridges.—Two-thirds of a mile eastward of Caughnawaga, the Canadian Pacific Railway bridge, with 60 feet (18m3) headroom, crosses the St. Lawrence River, the width here, being half a mile.

About 2 cables below the railway bridge, there is a traffic bridge connecting the villages of Ville La Salle and Caughnawaga; the channel for navigation, 375 feet (114m3) wide, is near the south shore and has 62 feet (18m9) headroom above low water stages.

Lights.—At night, the following lights are shown at the Canadian Pacific Railway swing bridge, across the canal, half a mile from the upper, or Lake St. Louis end. A *white* light is shown at each end of the swing protection. Both ends of the swing span carry lanterns, showing *red* lights, when the passage is closed, and *green* lights, when the swing is open.

Lachine *(Lat. 45° 26′ N. Long. 75° 41′ W.)*, at the Lake St. Louis entrance to the Lachine Canal, had, in 1951, a population of 27,773. From the lake, the most conspicuous objects are the dome of the old convent, the two-spired church, a little west of it, and the tower of the new convent north of them.

Leading lights.—On the outer end of Lachine Railway wharf is erected a white, circular structure, which, at a height of 28 feet (8m5), shows a *fixed green* light.

This light is visible in the channel south of the lighthouse, as well as in the line of range.

The rear similar structure and *fixed green* light stands 067°, 300 yards from the front light, and, at a height of 44 feet (13m1), is visible 14 miles. These lights, in line, lead 1¾ miles, through a dredged channel 300 feet (91m4) wide and 16 feet (4m9) deep, to abreast *flashing red* light-buoy 38 S.

Light.—Canal Pier.—On a small low crib, 300 yards (274m3) west of the end of the pier between the new and old channels, is exhibited a *fixed red* light. It marks the dividing point of the entrances to these canals.

Buoyage.—Between Lachine wharf and the front Dixie light, four red light-buoys, showing *flashing red* lights, mark the north side of the channel, and a black light-buoy, showing a *flashing white* light, on the south side of the channel, is moored on the northwest extreme of Chateauguay Shoal. A small rocky patch, with a depth of 8 feet (2m4) over it, lies abreast the northeast extreme of Chateauguay Shoal; it is marked by the western red light-buoy, No. 40, of the four mentioned above. This section of the channel is also marked by red spar and black spar buoys.

A spot, with 10 feet (3m0) over it, lies on the south side, close to the channel, one mile from Lachine wharf.

Lake St. Louis, an expansion of the St. Lawrence River, at its junction with the western mouth of the Ottawa River, is about 15 miles long, east and west, with a greatest breadth of 7 miles. The land near the shore is low. The depth in the ship channel is nowhere less than the canal depth of 14 feet (4m3) and, in the western portion, considerably more. The current has an average rate of about half a knot. The western portion of the lake is occupied by Ile Perrot, 7 miles long and 3½ miles broad, having narrow shallow canoe passages on either side, into the portion of the Ottawa River named the Lake

Chart 1450.

of Two Mountains. The northwest and southwest parts of Ile Perrot are higher than the generality of the lake shore, that portion between the village of Ste. Jeanne (which has a small church) and **Pointe au Sable,** being about 80 feet (24^{m}4) high, and cultivated. Lake St. Louis is called **Lachine Lake** by many of the pilots.

Pointe Claire *(Lat. 45° 26′ N. Long. 73° 50′ W.)*—From Lachine, the north shore of Lake St. Louis trends in a general westerly direction, with a succession of curves, 6½ miles to Pointe Claire and the town of that name, which, in 1951, had a population of 8,753. A mile east of it is **Charlebois Point,** the west entrance point to **Valois Bay,** 1⅓ miles broad and three-quarters of a mile long. Pointe Claire wharf has a face 110 feet (33^{m}5) long, with a depth of 6 feet (1^{m}8) along the face. In the approach channel is a depth of 8 feet (2^{m}4). Pointe Claire church is conspicuous from the lake. The stations of the Canadian National and the Canadian Pacific Railways are situated three-quarters of a mile back of the village. Between Lachine and Pointe Claire are several villages, connected by rail with Montreal, the principal being **Summerlea, Dorval,** and **Valois.** Excepting when masked by Dorval Island, the church spire at Dorval is very conspicuous from the channel. A submarine cable is laid from the north shore of Dorval Island to the north shore of the lake.

The incorporated town of Dorval Island, situated upon the island of the same name, is one of the finest summer resorts near Montreal.

Ferry.—A ferry operates between the village of Dorval and Dorval Island.

Buoy.—A red light-buoy, showing a *flashing red* light, is moored 550 feet (167^{m}6) southward of Allan Point.

Marine railways.—The St. Lawrence Yacht Club has two marine railways at Dorval.

Steamer Channel.—Buoyage.—Starting from abreast Dixie front light, a steamer channel leads from the ship channel in Lake St. Louis to Ste. Anne de Bellevue and the Ottawa River. Marking the junction of the two channels, a light-buoy, No. 72 S, painted in red and black horizontal bands and showing a *flashing red* light, is moored 400 yards (365^{m}8) southwestward of Dixie front light. The west side of the channel is marked by a black light-buoy, No. 45 S, showing a *flashing white* light, moored 1,500 yards (1,371^{m}6) above No. 72, and two black spar buoys, between Nos. 72 and 45.

Dorval lights.—Dorval lighthouse, a white square building, is erected on a pier, situated a little to northward of the steamer channel about half a mile south of Valois Point; at a height of 35 feet (10^{m}7), it exhibits two *fixed green* lights, one from a headlight lantern and the other from a reflector in a headlight lantern. The lanterns are on two white cylindrical gas tanks on a concrete pier. The reflector lantern is placed northward of the lens lantern and the light shows to the southwestward along the channel.

Pointe Claire light-buoy is moored about 75 feet (22^{m}9) south of a submerged pier, situated about 1·2 miles southeastward of Pointe Claire village. Dorval lights in line with this buoy lead through the channel from light-buoy No. 50, off Pointe Claire, to half-way to Pointe Claire light-buoy, a red buoy showing a *flashing red* light.

Point Claire wharf leading lights.—Two leading lights, *fixed green,* shown from white diamond-shaped daymarks on Pointe Claire wharf, lead from the main channel to the wharf.

Chart 1450.

About $1\frac{3}{4}$ miles westward of Pointe Claire is the Lord Reading Yacht Club, where there is a small marine railway and a small dredged basin with a depth of 5 feet (1^m5).

Ste. Anne de Bellevue *(Lat. 45° 24′ N., Long. 73° 57′ W.)*—From Pointe Claire, the north shore of Lake St. Louis runs westerly, nearly straight, $6\frac{1}{4}$ miles, to Ste. Anne de Bellevue at the entrance to the Ottawa River. The town, which, in 1951, had a population of 3,342, is a station on both the Canadian National and Canadian Pacific Railways, by which, it is distant from Montreal, 20 miles. Two bridges span **Ste. Anne Rapids,** famous in song, and cross to the northern portion of Ile Perrot. By the steamer channel, Ste. Anne de Bellevue is distant from Lachine railway wharf, $13\frac{1}{2}$ miles. The Macdonald Agricultural College is the largest and most conspicuous group of buildings in the town.

Buoyage.—A black spar buoy is moored at the turn in the channel, 450 yards (411^m5) southward of Dorval lighthouse. Near Pointe Claire light-buoy, two rocky shallow spots, on the edges of the channel, are marked by a red spar and a black spar buoy. Opposite Pointe Claire, a red light-buoy, No. 50 S, showing a *fixed red* light, marks the intersection of the Pointe Claire-Dorval leading line with that of the Dowker Point-Caron Point lights.

Lights.—On Dowker Point, the northeast extreme of **Lynch Island,** is erected a structure, with a white concrete base surmounted by a white steel cylindrical tank with a red lantern that, at an elevation of 20 feet (6^m1), exhibits a *fixed red* light. The light is unwatched.

On Caron Point, situated $1\frac{3}{4}$ miles east of Ste. Anne Canal lock, is erected on a concrete pier a white, square, steel skeleton tower with red square iron lantern and white slatted daymark on the eastern side, that, from a height of 28 feet (8^m5), exhibits a *fixed red* light. This light in line with Dowker Point light, at the north edge of the trees on Lynch Island, bearing 259°, leads through 2 miles of the steamer channel approaching Ottawa River.

Buoys.—A red spar buoy 525, equipped with a reflector band, is moored on the edge of the channel 2 miles eastward of Dowker Point, and a black spar buoy, half a mile from the same point, marks the turn in the channel off the alignment of Dowker Point-Caron Point lights. A red light-buoy, showing a *flashing red* light, is moored about 1,500 feet (357^m2) 004° from Dowker Point light.

Buoys.—Lynch Channel, between Dowker Point and Sherringham Park, is marked by red spar and black spar buoys. One of the red buoys, half a mile from the point, marks a spot, with $10\frac{1}{2}$ feet (3^m2) over it, lying in the middle of the channel. A red light-buoy, 64S, showing a *flashing red* light, is moored on the northern side of the channel at the turn, 3 cables northeastward of Ile Perrot front light. Two red spar buoys and a black spar buoy mark the channel between Sherringham Park and Ste. Anne de Bellevue.

Channel.—Buoys.—In 1939, a channel, 100 feet (30^m5) wide, lying between Madore Island and Pointe du Domaine, known locally as La Passe, was dredged to a depth of 5 feet (1^m5). Small boats may save considerable time by using this channel in the passage from the Ottawa River to Beauharnois and the St. Lawrence River. The north and south entrances to this channel are each marked by a red spar and a black spar buoy.

Chart 1450.

Ile Perrot leading lights.—These *fixed white* lights are situated on the island of that name, and on the west point of **Madore Bay.** The front is shown from a white square lantern with a red roof, at an elevation of 23 feet (7^{m}0); the rear is shown from a pole, with a white diamond-shaped daymark, at an elevation of 31 feet (9^{m}4).

These lights in line, bearing 234½° lead through Lynch Channel from the bend at Dowker wharf, on Lynch Island, to the point at **Sherringham Park.**

Wharf.—Half a mile west of Sherringham Park is a Government wharf with a face 78 feet (23^{m}8) in length; along the face is a depth of 10½ feet (3^{m}2).

Submarine cable.—A submarine cable crosses the lake from Madore Bay to Caron Point.

Lights.—Ste. Anne de Bellevue.—The northern light is shown from a white, square, structure on the northwest end of the dredged channel cribwork off Brussy Point. The southern light is shown from a white skeleton tower near the southeast end of the same cribwork. At a height of 24 feet (7^{m}3), each structure exhibits a *fixed white* light.

Wharves.—A Government wharf, 120 feet (36^{m}6) long, parallel to the channel, with 6 feet (1^{m}8) of water along the face, is situated 400 feet (121^{m}9) below the lower end of the lock of Ste. Anne de Bellevue. The McColl-Frontenac wharf is situated immediately below the Government wharf; in 1939 a berth, 100 feet (30^{m}5) long at this wharf, was dredged to a depth of 9 feet (2^{m}7).

Ste. Anne lock *(Lat. 45° 24′ N. Long. 73° 57′ W.)*—The new lock, (*see* page xxxviii) 200 feet (61^{m}0) long and 45 feet (13^{m}7) wide, has a depth of 9 feet (2^{m}7) on the sill; the old lock, 190 feet (57^{m}9) long and the same width as the new, has only 6 feet (1^{m}8) on the sill. By means of either of these locks and the canal, 220 yards (201^{m}2) long, the difference in level of 3 feet (0^{m}9) between Lake St. Louis and Lake of Two Mountains, Ottawa River, is overcome. For 27 miles across the latter, there is a navigable stretch on the Ottawa River to the Carillon Rapids, which are overcome by the canal of this name, one mile in length, the locks of which are available to the same class of vessel.

The Long Sault Rapids, a short distance above, are avoided by the Grenville Canal of similar proportion and depth, whence, to Ottawa, distant 56 miles, there is unimpeded navigation.

(For Ottawa River, *see* Chapter V).

Lights.—Ste. Anne lock.—On the end of the pier, 400 yards (365^{m}8) southeast of Ste. Anne lock, is shown from a square building, a *fixed red* light at a height of 12 feet (3^{m}7).

Upper entrance leading lights: Front light.—On the northeast pier of the canal is erected a mast, with a white diamond-shaped slatwork daymark having a black border, which shows a *fixed green* light at a height of 57 feet (17^{m}4).

Rear light.—On the canal bank, at the C.P.R. bridge, 415 feet (126^{m}5), 128° from the above front light, is situated a mast, with a white diamond-shaped slatwork daymark having a black border, showing at an elevation of 74 feet (22^{m}6), a *fixed green* light.

These two lights in alignment lead from the buoy at the turn into Vaudreuil Bay, to the canal lock.

Chart 1450.

Outer front light.—At a height of 45 feet (13m7), a *fixed green* light, 625 feet (190m5), 313° from the common rear light at the bridge, is shown from a white steel skeleton tower, with white rectangular slatwork daymark.

This is the northwestern of the three lights immediately above the three Ste. Anne bridges. The alignment, with the common rear light, leads from Ile Cadieux to Ile aux Tourtes, in Lake of Two Mountains.

Directions, Lachine to Ste. Anne de Bellevue.—Follow the steamship channel south of Dixie, Bushy, and Dorval Islands, diverging from the ship channel at Dixie front leading light; thence follow the channel to Dorval light for description of which, *see* page 91. From the latter light, a 252° course is steered for 1⅔ miles passing between the red spar and the black spar buoy off Pointe Claire light-buoy. Hence, Pointe Claire wharf may be steered for, if calling there, or, if continuing, the Dorval and Pointe Claire leading line must be kept on, astern, the vessel steering 248° until abreast red light-buoy 50 S. Thence, Caron Point light should be seen in line with Dowker Point light at the north edge of the trees on Lynch Island, and steer 258½°, for 2 miles. Here, a vessel should haul slowly round **Thompson Point** to the north of Dowker light, steering 283° for half a mile, and then keep Caron Point light a little on the starboard bow, to take the range of Ile Perrot lights at a point one cable north of Dowker Point light. Keep them in one, bearing 234°, until 500 yards (457m2) from the front light, when haul up to 263°, and keep the Ile Perrot shore close aboard, until the Ste. Anne de Bellevue lights are almost on.

When a little west of Ile Perrot wharf, haul sharply northward, passing to the east of Ste. Anne de Bellevue northeast light, and, thence, through the narrow cribwork channel; when abreast the northwestern Ste. Anne de Bellevue light, steer for the southeast entrance of Ste. Anne Canal, marked by the light described on page .

St. Bernard Island.—From Caughnawaga wharf, the south shore of Lake St. Louis trends, irregularly, westerly, 3½ miles, to the north extreme of St. Bernard Island, close east of which is the mouth of the **Chateauguay River.** The north coast of St. Bernard Island is low, and, with the exception of a couple of conspicuous trees, quite bare of woods.

The southwest extremity of St. Bernard Island is marked by a small conspicuous green hill, about 100 feet (30m5) high, named **The Mound** (*Lat. 45° 23′N. Long. 73° 46′W.*) on which is erected a cross. A channel, one mile long, for light draught vessels, leads to Chateauguay, south of The Mound.

Chateauguay is situated on the river of this name, 1¼ miles from its mouth, and close to the south end of St. Bernard Island. It is a station of the New York Central Railway, having connection with Montreal and Valleyfield, from the former of which it is distant, by rail, 14 miles. There is a Government wharf with a face 143 feet (43m6) long and along the face is a depth of 8 feet (2m4).

Beacons.—Buoys.—Two sets of diamond-shaped beacons, near the north end of St. Bernard Island, guide small craft into Chateauguay River, and the entrance is buoyed. There is a reported depth of 8 feet (2m4) in the channel.

Dixie leading lights.—Front.—A white wooden tower stands on a concrete pier, in 7 feet (2m1) of water, 2½ miles, 253° from Lachine wharf front light. It exhibits at an elevation of 33 feet (10m1), a *fixed green* light, visible over an arc of 135°, on each side of the range.

Chart 1450.

The rear brown skeleton tower, with white wooden slatwork on the side facing the alignment and with a white lantern, stands on a similar pier close off the northwest side of Dixie Island 1·25 miles, 051° from the front light. It exhibits, at an elevation of 83 feet (25^{m}3), a *fixed green* light, visible in the line of the range only.

The lights in one, bearing 051° astern, lead westward-bound vessels, from abreast light-buoy 72S., to their intersection with the Melochville range.

Beauharnois *(Lat. 45° 19′ N. Long. 73° 53′ W.)*—The shore of the lake trends, from The Mound, southwesterly, a distance of 7½ miles, to **St. Louis Pointe,** close northwest of the town of Beauharnois, which, in 1951, had a population of 5,694. This town has connection with Montreal and Valleyfield, by the New York Central Railway, and, with the Canadian National Railways, through **St. Martine Junction,** distant about 6 miles. It has a landing pier 2½ miles west of Windmill Pointe of Ile Perrot. Its church has two spires, and situated on low land northwest of the church is a large factory. There is a Government wharf extending 117 feet (35^{m}7) north and thence 83 feet (25^{m}3) west. In 1940, there was a depth of 12 to 15 feet (3^{m}7 to 4^{m}6) alongside. The wharf is protected by a breakwater, 150 feet (45^{m}7) in length, with a depth of 12 feet (3^{m}7) in the berth, 80 feet (24^{m}4) in length, alongside. The channel of approach, with a least depth of 10 feet (3^{m}0) is marked by spar buoys.

The shore between St. Bernard Island and Beauharnois is fronted by an extensive group of low islands, known as **Iles de la Paix,** being separated from **Hebert Point,** 1⅓ miles east of Beauharnois, by **Bergeron Channel,** narrow and crooked.

Wharf.—There is a Government wharf at De Lery (Bellevue) 1·6 miles eastward of Hebert Point, with a face 60 feet (18^{m}3) long and a depth of 6 feet (1^{m}8) alongside.

Beauharnois leading lights.—The front light is a lantern on a white diamond-shaped slatwork daymark erected on the wharf, that at an elevation of 14 feet (4^{m}3) shows a *fixed red* light. The rear light 415 feet (126^{m}5), 175° from the front, is a similar structure also showing a *fixed red* light, at an elevation of 30 feet (9^{m}1).

Buoy.—A black spar buoy is moored about 2,700 feet (823^{m}0) north-northwestward of St. Louis Pointe, and a red spar buoy, on the alignment of the above lights, 3,500 feet (1,066^{m}9) from the front light.

New Beauharnois Canal.—The Beauharnois development consists of a power-house on the shore of Lake St. Louis, and a canal south of the St. Lawrence River about 15 miles long and 3,000 feet (914^{m}4) wide, connecting Lake St. Louis and Lake St. Francis. The difference of elevation of the two lakes, amounting to 83 feet, (25^{m}3) is overcome by a single lock. The head of the canal is a third of a mile south of Grosse Pointe, and the power-house is located midway between the villages of Beauharnois and Melocheville.

Melocheville *(Lat. 45° 19′ N. Long. 73° 56′ W.),* at the east entrance to the old Beauharnois Canal, is 2 miles westward of Beauharnois. The canal has a lengh of 12 miles, with depth of 9 feet (2^{m}7) on the sills of the locks, but since the opening of Soulanges Canal on the opposite side of the river, has been abandoned for navigation purposes.

Chart 1450.

Leading lights.—*Fixed green* leading lights are shown on the south side of the lower end of the old Beauharnois Canal; the front light is shown, at an elevation of 42 feet (12^{m}8), from a white square structure with a red lantern; the rear light is shown, at an elevation of 88 feet (26^{m}8), from a red, steel skeleton tower, surmounted by a white watch room with a red iron lantern, 1,478 feet (450^{m}5) from the front light. The lights in line, bearing 232°, lead from abreast Windmill Point to their intersection with the Cascades range.

Westward, 2 miles from Melocheville, is **Pointe Buisson,** where the river, under the name of **Split Rock Rapids,** is about 830 yards (759^{m}0) wide. Between the last named point and Joubert Island are Cascades Rapids; while between Melocheville and Cascades Island are the **Haystacks Rapids;** the narrow water, between Cascades Island and the point of this name, is known as **Les Faucilles.**

Cascades Point, on the northwest side of the St. Lawrence River, is situated at the west end of Lake St. Louis, and a mile northwest of Melocheville, the river space between being occupied by **Cascades** and **Joubert Islands.** The river, here, becomes a series of rapids, through which steamers, drawing less than 5 feet, (1^{m}5) can descend.

CAUTION.—Examination of the channel, between Cascades Island and the 5-foot (1^{m}5) shoal to the east, has shown that the water throughout this channel has shoaled greatly since 1906 and that spots with depths of 13 feet (4^{m}0), or less, are numerous. One such spot in particular lies half a mile east of the northern extreme of Cascades Island. From the 5-foot (1^{m}5) spot, a spit extends, 1,200 feet, (365^{m}8) southwesterly, having depths of 10 and 13 feet (3^{m}0 and 4^{m}0).

Lights.—Cascades leading lights.—The front white, square, wooden tower stands 50 feet (15^{m}2) back from the water's edge three-quarters of a mile northwestward of Cascades Church, and, at an elevation of 32 feet (9^{m}8), exhibits a *fixed green* light. The rear similar structure stands half a mile west of the front, and exhibits, at an elevation of 87 feet (26^{m}5), a *fixed green* light. These lights in line, bearing 273°, lead, from their intersection with Melocheville range, up to their intersection with Soulanges Canal leading lights.

Ste. Jeanne.—Wharf.—The Government wharf at Ste. Jeanne, 2½ miles westward of Windmill Point, Ile Perrot, has a pierhead 81 feet (24^{m}7) by 34 feet, (10^{m}4) with a depth of 8 feet (2^{m}4) alongside.

Soulanges Canal, on the northwest side of the river, connects Lakes St. Louis and St. Francis, overcoming the natural rapids and shallows between them. The length of the canal is 14¾ miles, the depth on the sills of its locks is 15 feet (4^{m}6); the length and breadth of the locks being 280 and 46 feet (85^{m}3 and 14^{m}0) respectively. It has five locks, one being a guard lock. The distance by the ship channel, between the entrance locks of the Lachine and Soulanges Canals, is 16 miles (*see* also page xxxiv).

The canal is illuminated by electricity. The lockage, or difference of level between Lakes St. Louis and St. Francis, is 83½ feet (25^{m}4).

Semaphore.—A semaphore has been installed at the guard gate of the Soulanges Canal south side, to signal eastbound vessels whether or not lock No. 3 is ready for them. When lock No. 3 is occupied, the arm of the semaphore will be set horizontally in the daytime against eastbound traffic and at night a red light will be shown; when the lock is clear, the arm will be set vertically in the daytime, and a green light will be displayed at night.

Chart 1450.

Bridge signal lights.—Signal lights, placed 2 feet (0m6) out of line of the white lights, have been installed 2,400 feet (731m5) above and below each of the five swing bridges over the Soulanges Canal, for the purpose of notifying navigators of vessels when to signal to have the bridges opened. A *steady red* signal or *no* signal indicates that the bridge is not ready, and a *green* light that it is ready for the passage of a vessel. A *flashing red* light indicates that the bridge is being made ready for the passage of a vessel.

Leading Lights.—Soulanges Canal lower entrance.—The front white circular structure stands on the canal northern pierhead, and, at a height of 37 feet (11m3), exhibits a *fixed red* light. The rear similar structure, 59 feet (18m0) high, stands 1,826 feet (556m5), 244°, from the other, and exhibits, also, a *fixed red* light.

These lights, in line, lead to its intersection with Cascades range.

Chart 1449.

Dorion *(Lat. 45° 23′ N., Long. 74° 00′ W.)*—To Cascades Point, the western branch of the Ottawa River flows from Dorion, a distance of 5 miles, the channel being suitable for small craft only. The town had, in 1951, a population of 2,413 and has connection with Montreal, Ottawa, and Toronto by both the Canadian Pacific and Canadian National Railways; the Ottawa River, here, being spanned by two railway bridges.

Buoyage.—Between Dixie light and Soulanges Canal, the north and northwest sides of the channel are marked by five red light-buoys, showing *flashing red* lights, numbered from eastward 76S, 86S, 98S, 100S, and 104S; and the southwest side of the channel is marked by two black light-buoys, 77S and 83S, both showing *flashing white* lights. In addition to the light-buoys, this part of the channel is marked by ten red spar and three black spar buoys. Buoys No. 98, 100 and 77 are fitted with radar reflectors.

Caution.—Investigation of the shoal, lying off Windmill Point, shows that the shoal area has increased and now extends further to the eastward and southward. A spot, with 6 feet (1m8) of water over it, rock bottom, lies 2,500 feet (762m0) 088° from Windmill Point, and a depth of 12 feet (3m7) will be found about 300 feet (91m4) south of the 6-foot (1m8) spot. At this place, the ship channel takes a sweep to the southward to avoid the shoal water, marked by a red light-buoy 98S.

Chart 1450.

Directions, Lachine to Soulanges Canal.—Leaving Lachine Canal, a vessel will bring the Lachine leading lights in line astern, steering 247° for 1¾ miles, as far as red light-buoy 38S, passing northward of two black spar buoys and southward of red light-buoys 20S and 28S, and seven red spar buoys.

From light-buoy 38S, steer 263° three-quarters of a mile to about 150 yards (137m2) south of Dixie front leading light, passing between light-buoys 40S and 39½S. Hence haul westward and southward to pass in mid-channel southeastward of red and black buoy, 72S, and a red spar buoy, and northwestward of two black spars, bringing gradually in line astern the lights of Dixie range, steering 231° about 5¼ miles to red spar buoy 92S, near Windmill Point, keeping south of red light-buoys 76S and 86S and eight red spar buoys, and close northward of black light-buoys 77S, and 83S. From red spar buoy 92S, the range should be left so as to pass south of light-buoy 98S.

Chart 1450.

Hence, the line of the Melocheville leading lights, bearing 232° should be kept for 3 miles until nearly up to red light-buoy 100S. Round the buoy, and bring the Cascades leading lights on, steering 273°, for 2½ miles, to light-buoy 104S, passing south of red spar 102S. Leaving light-buoy 104S on the starboard hand, proceed 244° for the entrance of Soulanges Canal on the line of the leading lights.

Lachine Rapids, Chateauguay, Ste. Anne de Bellevue.—A vessel, leaving Lachine Canal and wishing to run the rapids, will pass between black spar buoy No. 21 and the red spar buoy moored southwestward of Lachine Wharf; then close northeastward of the black spar on Champlain Shoal and proceed downstream.

If proceeding to Chateauguay River, a vessel, when past red spar buoy 32S, one-third of a mile below light-buoy 38S (*see* above), will steer 228° with St. Bernard Island beacons in line, for 1¾ miles, until the inner set of beacons comes in line, leading into the river mouth. (*See* page 94).

If bound to Ste. Anne de Bellevue by the steamer channel, a vessel will steer to pass close northward of light-buoy 72S, then steer about a mile, 305°, for Dorval light, passing close northwestward of two black spars, and of black cylindrical light-buoy 45 S; a vessel should turn in sufficient time, so as not to approach the latter light nearer than 250 yards (228m6), whence proceed by steamer channel as directed on page 94.

Soulanges Canal to Lachine.—Steer 064° from Soulanges Canal, with the canal leading lights in line astern, until Cascades leading lights come on, or to within 300 yards (274m3) of red light-buoy 104 S, when haul sharply eastward to bring the Cascades leading lights in line astern, steering 093°, 2½ miles, to red light-buoy 100 S. From red light-buoy 100 S, keep the Melocheville leading lights in line astern, steering 052°, for 3 miles, or until red light-buoy 98 S, off Windmill Point is reached. When approaching this buoy, the range should be left so as to pass to the south of it. From this point, the Dixie range lights should be seen, in line ahead, bearing 051°. Steer to pass south of the red spar, and red light-buoys, until about a cable southward of red and black light-buoy 72 S.

Hence haul to northward and eastward, to pass about a cable south of Dixie front light, when a course of 083° should be steered for about three-quarters of a mile, to red light-buoy 38 S, having passed between light-buoys 39½ S and 40 S. From light-buoy 38 S, steer 067°, with the Lachine leading lights in line ahead, for 1¾ miles. On the latter range, a vessel will leave seven red spar buoys, and red light-buoys 20 S and 28 S on her port, and three black spars, on her starboard hand. A vessel may now proceed to the canal, or wharf, as necessary.

If running Lachine Rapids, a vessel from red light-buoy 38 S will steer 080° for 9 cables, then haul to southward to pass close north of the black spar buoy marking Champlain Shoal, at the head of Lachine Rapids.

Coteau and **Cedar Rapids.**—The portion of the St. Lawrence River between Lakes St. Louis and St. Francis, about 14½ miles in length has, in the western half, several islands, the largest of which is **Ile de Salaberry** 6 miles long, and 1¾ miles in average breadth. The southwestern part is traversed by the Canadian National Railways. **St. Timothée** on the south and **Cedars** opposite it, on the north shore, are situated nearly midway between the lakes, are marked by large power plants, and are separated by **Cedar Rapids. Coteau du Lac** on the north shore, having, in 1951, a population of 503, is 3 miles northeast of Coteau Landing and near the mouth of **Rivière Rouge** and **Rivière Delisle.** Between Coteau du Lac and Coteau Landing are **Coteau Rapids.**

Chart 1450.

Dams.—Dams have been built in the river from Ile Juillet, *(Lat. 45° 18′ N. Long. 74° 04′ W.)* to the mainland northward, near the village of Cedars, and from the same island to the north shore of Ile de Salaberry. The sole means of transit from Lake St. Louis to Lake St. Francis is via the Soulanges Canal.

From the southwest shore of Ile de Salaberry, dams have been constructed to Maple Island; from Maple Island to Ile de Salaberry; from the latter island to Leonard Island, and from Leonard Island to Marigny Island; thence to the northern mainland shore.

Wharf.—At Coteau du Lac, there is a Government wharf on the south-side of the canal, with a face 89 feet (27m1) in length; along the face is a depth of 10 feet (3m0).

Chart 1451.

Lake St. Francis, an expansion of the St. Lawrence River, is 27 (23½ nautical) miles long, from the Canadian National Railways bridge at Coteau Landing, to Glengarry Point, its greatest breadth being 4 miles. The shores are low, and the strength of the current is not great, nowhere exceeding a rate of half a knot. The principal villages on the northwest shore of the Lake are Coteau Landing, South Lancaster, and Summerstown. The Canadian National Railways follow this shore from one to two miles back, Lancaster station being about 1½ miles from the village on the shore. On the southeast shore, the only village near the lake, is St. Anicet, with its very conspicuous church. The southwestern portion of this shore is very low, and, sometimes, under water.

The boundary on the northwest shore, between the Provinces of Quebec and Ontario, is near McKies Point. On the southeast shore, the southern limit of Quebec Province, is the International Boundary line of the forty-fifth parallel of latitude.

The depths in the ship channel of Lake St. Francis are nowhere less than the canal depth, 14 feet (4m3), and, in the greater part of the channel, considerably more. This lake is spoken of by some of the pilots, as **Coteau Lake.**

Charts 1454, 1451.

Valleyfield had, in 1951, a population of 22,414, and is situated on the southeast shore, and at the northeast end of Lake St. Francis. It also stands at the upper end of the old Beauharnois Canal (*see* page 95). It is connected to Montreal by the New York Central Railway; to Montreal, Toronto, and Ottawa, also, by the Canadian National Railways through Coteau Junction. A portion of the town is built on Ile de Salaberry connected to the southeast main shore by a dam. The Canadian National Railways bridge crosses from this island to the same shore, half a mile eastward of the town.

Church spires and the tall chimneys of large factories are conspicuous from the lake.

Manufactures.—Valleyfield is a manufacturing town, the principal industry being cotton goods.

The entrance of the Beauharnois Power Canal lies one-third of a mile south of Grosse Pointe. (*See* page 95).

Channel.—Buoys.—The channel passes southward of a submerged crib off Pointe Rousson, and close to the southeastern end of Ile aux Chats. This channel marked by spar buoys, has a least depth of 9 feet (2m7). It should be noted

Charts 1454, 1451.

that the buoys in the entrance to this harbour from upstream are red to starboard and black to port as Valleyfield, from the upper entrance of the Soulanges Canal is, considered the head of navigation.

Light.—On the south side of the channel, and about 2 cables northwestward from Pointe Rousson, a *flashing white* light is shown, at a height of 10 feet (3^m0), from a steel structure on a pier. This pier is opposite the black spar buoy marking the outer end of the submerged pier on the north side of the channel. about $1\frac{1}{2}$ cables southwestward of the above pier are the ruins of a smaller pier.

Caution.—The bottom of the channel is strewn with large boulders which may be moved by the ice each spring. Mariners are advised to navigate here with caution.

Chart 1452.

Buoys.—A red spar buoy is moored about $1\frac{3}{4}$ cables northwestward of Ile de la Grosse-Pointe, to mark the edge of the shorebank.

The submerged pier, on the north side of the channel opposite Pointe Rousson, is marked by two black spar buoys moored at the east and west ends, and on the south side of the channel by a red spar buoy; a red and black spar buoy mark the channel southward of the smaller ruined pier of the southwestward.

Port Lewis *(Lat. 45° 10′ N. Long. 74° 17′ W.)*—From Grosse-Pointe, the low southeast shore of Lake St. Francis turns abruptly, and runs south $2\frac{3}{4}$ miles, forming the east shore of **Hungry Bay.** Hence the shore trends nearly west, $6\frac{1}{4}$ miles, to the landing wharf at the small village of **Port Lewis.** This wharf has a "T" end $98\frac{1}{2}$ feet (30^m0) long with a depth of 7 feet (2^m1) along the face.

Grenadier Island.—Eastward $1\frac{1}{2}$ miles from Port Lewis wharf is **Pointe Biron** close northeast of which is a small island called **Francs-Tireurs.** Grenadier Island, 270 yards (246^m8) long, 100 yards (91^m4) broad and about 10 feet (3^m0) high, is situated 355°, distant a mile from Pointe Biron. The trees on the island being different in character from those on the neighbouring shore, together with a small house, render it conspicuous. Shoal water extends three-quarters of a mile east and west of it, and, in the latter direction, is situated a small cluster of stones, above water, known as **The Lump.**

A bank, a third of mile long northeast and southwest, with 5 to 6 feet (1^m5 to 1^m8) of water over it, lies $1\frac{1}{2}$ miles, 305°, from **Pointe Seigneuriale,** at the head of Hungry Bay.

From Port Lewis, the south shore of Lake St. Francis trends westward $3\frac{3}{4}$ miles to **Pointe Caissonnettes,** two-thirds of a mile northeast of St. Anicet wharf, **Caza Island,** small, and close to the shore, is situated three-quarters of a mile eastward of Pointe Caissonnettes.

Ile Chrétien, the largest of three, is situated $1\frac{1}{2}$ miles northeast of Pointe Caissonnettes, and a quarter of a mile off **Casault Point.**

Port Lewis Flats.—The south shore of Lake St. Francis between Ile Chrétien and the head of Hungry Bay, is fronted by a shallow bank, 300 yards (274^m3) wide at Ile Chrétien, $2\frac{1}{4}$ miles off Port Lewis, and one mile off the head of Hungry Bay, on which is a least depth of 6 feet (1^m8), leaving a channel between it and the bank from the north shore, a third of a mile wide, with depths over 18 feet (5^m5).

Clearing marks.—St. Zotique church in line with Hay Point, bearing 043°, leads one cable northwest of Port Lewis Flats.

Chart 1452.

St. Anicet *(Lat. 45° 08′ N. Long. 74° 22′ W.)* is a small village on the southeast shore. Its church is a very ornate and imposing edifice, the dome being particularly conspicuous, and serving as a useful steering mark. The Government wharf has a face 93 feet (28m3) long, with a depth of 6½ feet (1m9) in the berth along the face. A depth of 7 feet (2m1) can be carried to the wharf. Half a mile east of St. Anicet is the mouth of a stream named **Rivière à la Guerre.**

St. Anicet Shoal, with a least depth of 5 feet (1m5) of water over it, lies off Pointe Caissonnettes and St. Anicet, its length northeast and southwest being 2¼ miles; it is separated from the shorebank at those places, by a channel 200 yards (182m9) broad and 20 feet (6m1) deep. The ship channel, a third of a mile wide with not less than this depth, passes between St. Anicet Shoal and Pointe Mouillée Flats.

Light-buoy.—On the northwest edge of St. Anicet Shoal, and on the southeast side of the ship channel, is moored a black cylindrical light-bouy 57F, showing a *flashing white* light. It bears 352°, distant one mile, from St. Anicet church.

The ruins of a small pier, about 10 feet (3m0) high, lie close southeast of the buoy on the edge of the bank. This pier originally supported St. Anicet Shoal lighthouse, which has disappeared.

Buoyage.—A black spar buoy is moored on the north edge of St. Anicet Shoal, three-quarters of a mile below the old lighthouse pier; a similar buoy is moored on an isolated spot, with a depth of 18 feet (5m5) over it, off Ile Chrétien, and a third black spar buoy marks the edge of the shorebank three-quarters of a mile below the island.

Pointe Dupuis, on the south shore, is situated a little over 2 miles westward of St. Anicet, the flat between, under the depth of 6 feet (1m8), and in places practically dry, extending out more than half a mile. A small islet, named **Lanouette,** with three smaller ones, lies close westward of the point.

Cherry Island light.—This island, quite small, with trees close west of the lighthouse, lies three-quarters of a mile northeastward of Pointe Dupuis, about 1½ miles westward of St. Anicet church, and three-tenths of a mile from the nearest land. On it is erected a white hexagonal building, which, at a height of 40 feet (12m2), exhibits a *flashing green* light, visible 13 miles. This light is unwatched.

Charts 1453, 1451.

South Channel.—From abreast Pointe Dupuis, a series of channels lead up the southern portion of Lake St. Francis, uniting with the steamer channels near the east end of St. Regis Island. This portion of the lake is a maze of shoal areas overgrown with weeds and rushes in midsummer and with many deep, winding intersecting channels, none of which have any aids to navigation. They are navigable, however, for yachts and motor-boats by using ordinary caution, and lead to various summer resorts along the south shore, as **Frasers Point** (south shore) opposite the point of the same name on the north shore, Salmon River and Hopkins Point. Bordering this southern channel are **Sheep, Cat, Kitten, Buchanan, Senécal, Content, Tarryawhile, Christatee, Plum,** and **Round** Islands, in the order named. Some of these islands are privately owned, others being Indian reserve territory.

Chart 1452.

Coteau Landing *(Lat. 45° 15′ N. Long. 74° 13′ W.)*, on the northwest shore, and at the northeast extremity of Lake St. Francis, is situated opposite the entrance to Soulanges Canal. It had, in 1951, a population of 387. Through the Canadian National Railways junction 1½ miles inland, there is railway connection with Toronto, Ottawa, and Montreal. The Canadian National Railways bridge crosses the St. Lawrence River half a mile below the southern canal entrance pier. The depth at the Government wharf is not less than 10 feet (3m0). A breakwater protecting the entrance to the canal lying in a northwesterly and southeasterly direction, and about 550 feet (167m6) long, is situated with its southern end bearing 230°, 300 yards (274m3) from the west end of the canal entrance pier.

Lights.—On the southeast end of the breakwater, there is erected a steel tank surmounted by a lantern, from which is exhibited a *flashing red* light, at an elevation of 17 feet (5m2). This light is unwatched.

Soulanges Canal upper entrance leading lights.—The front white circular building stands on the outer end of the northwest guard pier of the canal, and, at a height of 31 feet (9m4), exhibits a *fixed red* light. The rear similar structure is situated 1,585 feet (483m1), 037°, from the front light, and exhibits a similar light at a height of 46 feet (14m0). The line of these lights indicates the northwest edge of the dredged channel, and leads close northwest of red light-buoy 36 F.

Buoys.—A bank, under a depth of 12 feet (3m7) a quarter of a mile long, east and west, upon which the breakwater is constructed, lies 150 yards (137m2) eastward of the Government wharf at Coteau Landing. On the eastern portion of the bank there is a depth of 7 feet (2m1). A rock, with 9 feet (2m7) of water on it, lying on the central portion of this middleground, is marked by a red and black horizontally-striped buoy, 32 F, situated 200 yards (182m9), 116° from the head of the Coteau Government wharf.

A vessel from the canal can carry 10 feet (3m0) to the Government wharf, by passing 150 yards (137m2) southwest of the breakwater light, and 50 yards (45m7) northeast of buoy 32 F. From the westward, not less than that depth may be had from light-buoy 36 F to the wharf.

A red light-buoy, 36 F, showing a *flashing red* light, is moored 216°, 4,200 feet (1,280m2) from the breakwater light.

St. Zotique is situated on the northwest shore, its wharf being 1·7 miles southwestward from the Government wharf at Coteau Landing. The head of the wharf is 132 feet (40m2) long with a depth of 7 feet (2m1) along the face. The church spire is conspicuous.

Buoy.—A red spar buoy, 38 F, lies three-quarters of a mile south of St. Zotique church spire.

McKies Point *(Lat. 45° 12′ N. Long. 74° 19′ W.)*—From St. Zotique, the northwest shore runs in a general southwesterly direction, 5 miles to McKies Point, approximately marking the boundary between Quebec and Ontario. From the northeast, McKies Point, up to within 1½ miles of it, has the appearance of an island. The 3-fathom (5m5) edge of the shorebank, between Coteau Landing and McKies Point, is fairly straight. The low, bare projection with a few huts on it, 2 miles southwestward of St. Zotique, is called **Hay Point.**

Chart 1452.

Light.—A directional steering light is situated close westward of Hay Point. The light is shown at an elevation of 18 feet (5m5). It shows a *fixed white* light on a bearing of 036°, with a beam width of 1,000 feet (304m8), 4 miles from the light, converging as the light is approached. When off the fixed beam, on the starboard or south side, it shows a *white flash* every *three seconds;* when off the fixed beam to the port or north side, it shows an *occulting white* light every *3 seconds.*

Buoyage.—Marking the edge of this shorebank, 2·7 miles, 060°, from McKies Point light, is moored a red cylindrical light-buoy, 40 F, showing a *flashing red* light. It lies one-half mile southwest of Hay Point. One mile farther upstream and bearing 079°, distant 1·6 miles from McKies Point light, is a black cylindrical light-buoy, 43 F, showing a *quick flashing green* light. It lies on the southeast side of the ships' track, and is fitted with a radar reflector. A black light-buoy, 45 F, showing a *flashing white* light, is moored on the edge of the same bank, about half a mile from the above light-buoy 43 F.

A black spar, 41 F, is moored between the two light-buoys, 40 F, and 43 F, 770 yards (704m1) northeastward of 43 F on the north edge of a shoal patch, having a least depth of 11 feet (3m4).

Light.—On the extremity of McKies Point is situated a white square wooden building, which, at a height of 36 feet (11m0), exhibits a *fixed white* light.

Pointe Mouillée is 4 miles southwestward of McKies Point, and the shore between forms a deep bight, with depths under 10 feet (3m0). **Woods, Gunn,** and **Sutherland Creeks** discharge into this bight.

Chart 1452.

Pointe Mouillée Flats.—In addition to the shorebanks on either side of Pointe Mouillée, a shallow area, with as little as 5 feet (1m5) of water on its eastern portion, extends 3 miles down the lake from Pointe Mouillée, and takes the name of Pointe Mouillée Flats.

Light-buoy.—On the north side of the ship channel, and near the eastern extremity of the flats, is moored a red light-buoy, 48 F, showing a *quick flashing red* light, bearing 191°, distant 1·4 miles from McKies Point light. The buoy is fitted with a radar reflector.

South Lancaster.—From Pointe Mouillée, the north shore runs with a considerable inward curve, west of south, 5½ miles to South Lancaster, Ontario, the pier at which has a depth of 9 feet (2m7). South Lancaster has a church, but is not very conspicuous from the lake. A public road connects it with Lancaster, three-quarters of a mile distant, a station of the Canadian National Railways, by which communication is had with Toronto and Montreal, the latter distant 54 miles. Lancaster had, in 1951, a population of 548.

The course for South Lancaster wharf is, from St. Anicet Shoal black light-buoy, 250°, for 5½ miles and then haul up for the wharf.

Island Bank.—The shore between Pointe Mouillée and South Lancaster is fronted by extensive flats, the almost disconnected portion, a mile long, east and west, with depth of 5 feet (1m5), being known as Island Bank. Formerly Island Bank was separated by deep water, called **North Gully** (now filled in) from the shallow banks north of it, the ship channel between the bank and Lancaster bar light (*see* below) being named **South Gully.**

Chart 1452.

Buoyage.—The southern edge of Island Bank is marked by a red cylindrical light-buoy, 68 F, showing a *quick flashing red* light, bearing from Cherry Island light, 256°, distant 1½ miles.

A red light-buoy, 60 F, showing a *flashing red* light, moored a mile northeastward of Cherry Island light, marks the east edge of the shoal water off Pointe Mouillée.

Chart 1453.

Lancaster Bar.—The area of shallow water, almost blocking the river, but with a deep channel through it, southeast of Lancaster, is called Lancaster Bar.

Light *(Lat. 45° 07′ N. Long. 74° 27′ W.)*—Near the edge of the shallow bank, on the southeast side of the ship channel, is erected a white steel tower, displaying white diamond-shaped daymarks with yellow stripe down the centre, and exhibiting, from a height of 29 feet (8m8), a *flashing white* light. It is 2½ miles, 253°, from Cherry Island light. A small breakwater west of it protects it from running ice.

Butternut and **Ross Islands** occupy the middle of Lake St. Francis south of South Lancaster, the first and northern island being a quarter of a mile, and, the other half a mile in length. Butternut Island, which has several farm buildings near its northern end, lies close to the southeast side of the ship channel. From both islands, shallow banks extend northeastward 3 miles or to half a mile below Lancaster Bar lighthouse. Southeastward of these two and Thompson Island, the extensive shallow flats are pierced by three unbuoyed channels (in addition to the southern unbuoyed channel mentioned on page 107) which join the ship channel at Island Bank on the northeast, and at Hamilton Island on the southwest. These three passages, although narrow in places, have more than the canal depth of 14 feet (4m3).

Buoyage.—A black cylindrical light-buoy, 69 F, known as East Lancaster Bar buoy, showing a *flashing white* light, is moored on the south side of the ship channel, half a mile northeastward of Lancaster Bar lighthouse. A red light-buoy 72 F, showing a *flashing red* light, is moored on the north side of the channel, 2½ cables northwestward of the lighthouse. A red spar buoy, 70 F, is moored opposite 69 F.

A black spar buoy, 71 F, lies less than half a mile southwestward of the light. On the southeast side of the ship channel, and on the northwest edge of these extensive flats, is also moored a black spar buoy, 77 F fitted with a radar reflector, one mile below the northeast extremity of Butternut Island.

Between the last-mentioned two buoys, but on the northwest side of the ship channel, are moored a red spar buoy, 74 F, and a red cylindrical, light-buoy, 76 F, showing a *flashing red* light, distant one mile, and 1½ miles, respectively, southwestward of Lancaster Bar lighthouse.

Rivière aux Raisins, on the northwest shore, joins Lake St. Francis close west of South Lancaster. It is crossed near the mouth by a bridge, over which The Queen's Highway passes, and 1½ miles from the mouth it is spanned by the Canadian National Railways bridge, as far as which, there is water for steamers of light draught.

Fraser Point.—From the mouth of Black River, the shore trends south-southwesterly 3 miles to Fraser Point, a third of a mile northward of which is a creek of the same name. Two islands lie a quarter of mile off this shore, named **The Cairn** and **Grape Island,** a third of a mile, and a little over a mile,

Chart 1453.

respectively, southward of South Lancaster. The first, as its name indicates, has erected upon it a conspicuous stone cairn, called by some, **The Monument.** The shoal flats from this shore, as mentioned above, take the name of Lancaster Bar.

Lancaster Light.—Near the east edge of the shore flat, and on the northwest side of the ship channel, 1½ miles northeastward of Fraser Point, is erected a white, hexagonal, wooden building, exhibiting, at a height of 33 feet (10^{m}1), a *flashing white* light. This light is unwatched.

Squaw Island, about 5 feet (1^{m}5) high with a few bushes on it, is small and situated between Fraser Point and Butternut Island, on the northwest side of the ship channel.

Light-buoy.—A little east of the northeast extremity of a middleground, with 3 feet (0^{m}9) of water over it, is placed a red light-buoy, 78 F, showing a *flashing red* light, 350 yards (320^{m}0) south of the southeast extreme of Squaw Island. Vessels pass southeast of this buoy.

Highlander Shoal.—Buoy.—The red spar buoy, 80 F, fitted with a radar reflector, marking this middleground, with 18 feet (5^{m}5) of water on it, is moored about a third of a mile below St. Francis Middleground light (*see* below). The vessels track is southeast of this shoal.

Horseback Shoal, with 12 feet (3^{m}7) of water on it, on the southeast side of the ship channel, is half a mile northeastward of Highlander Shoal. A black can buoy is moored about 4,800 feet (1,463^{m}0), 045°, from the light on St. Francis Middleground.

Hamilton Island *(Lat. 45° 04′ N. Long. 74° 32′ W.)*—From Fraser Point the northwest shore of Lake St. Francis trends southwesterly, 2¼ miles, to a point close to the west extremity of Hamilton Island, and a third of a mile northeast of Summerstown. The last mentioned island, connected to the main shore by a bridge under which is a shallow boat passage, is three-quarters of a mile long, east and west, by half a mile broad. Southwestward, 200 yards (182^{m}9) from its lighthouse, is a wharf alongside which there is good water. Hamilton Island is about 30 feet (9^{m}1) high, and the compactness of the trees on its southeast side gives it a rounded and distinguishable character. It has a number of cottages on it.

Light.—On the southeast coast of Hamilton Island is erected a white square wooden building, which, at a height of 42 feet (12^{m}8), exhibits a *fixed red* light.

St. Francis Island, a third of a mile long and 350 yards (320^{m}0) in greatest breadth, lies northeast of Hamilton Island, being separated from it and the north shore by channels suitable for small craft.

Thompson Island, three-quarters of a mile long, and a third of a mile in greatest breadth, is situated on the southeast side of the ship channel, half a mile from St. Francis Island. It has farm buildings on it near its northern and northeastern points.

St. Francis Middleground.—Situated in the ship channel, 300 yards (274^{m}3) south of the middle of St. Francis Island, is a small middleground with 11 feet (3^{m}4) of water over it; vessels pass between it and St. Francis Island.

Chart 1453.

Light.—On the northeast extremity of this middleground is erected a white cylindrical steel gas tank, rising from a concrete base, surmounted by a red iron box and red lantern. It shows, from a height of 26 feet (7m9), a *flashing white* light, visible from all points of approach.

Glengarry Point.—The northwest shore of Lake St. Francis trends from Hamilton Island westerly, nearly 3¾ miles to Glengarry Point, which may be considered the western limit of the lake.

Light-buoy.—A red light-buoy, 88 F, showing a *flashing red* light, is moored 500 feet (152m4) south of Glengarry Point.

Renshaw Island, on the northwest side of the ship channel and nearly half a mile long, northeast and southwest, is separated from Hamilton Island by a narrow boat channel. The island is flat, 5 feet (1m5) high, and has some small shacks on its southern extremity.

Light.—Near the southwestern extremity of Renshaw Island, a *flashing red* light is shown, at an elevation of 30 feet (9m1), from a pole with white day-mark attached.

Buoyage.—A black cylindrical light-buoy, 83 F, showing a *flashing white* light, lies on the southeast side of the ship channel, opposite the lower end of Renshaw Island.

On the north side of the channel, opposite this light-buoy, is moored a red spar buoy, 82 F.

On the mainland behind Renshaw Island is the small village of **Summerstown.** Its wharf, now in ruins, has approaches for small craft both east and west of the above-mentioned island.

Half a mile westward of Summerstown is **Caribou Cameron,** with a conspicuous church spire, and a dwelling.

Clark Island *(Lat. 45° 03′ N. Long. 74° 34′ W.)* is situated on the northern side of the ship channel, and about 400 yards (365m0) from the main shore, from which it is separated by a narrow lane of deep water. It lies three-quarters of a mile southwest of Renshaw Island, the space between them being occupied by shallow rocky banks, with the exception of a passage for vessels of light draught.

Light-buoy.—A red cylindrical light-buoy, 84 F, showing a *flashing red* light, is moored on the northwest side of the ship channel, and east of Clark Island.

Stanley Island.—Between Hamilton Island and Glengarry Point, but on the southeast side of the ship channel, there are several islands, the northeastern one being named **Little Hog Island,** with small buildings and a wharf on it. Stanley Island, also on the southeast side of the channel, is situated a quarter of a mile west of Little Hog Island, a narrow, but deepwater channel running between them. On the north side of Stanley Island is a Government wharf with a face 140 feet (42m7) in length; along the face is a depth of 14 feet (4m3). There is a large summer hotel on the island and several houses. A broad and deep unbuoyed channel passes southward of both these islands, joining the ship channel south of Clark Island.

Light.—A *flashing green* light is exhibited, at an elevation of 18 feet (5m5), from a building on the end of the wharf on the northern side of Stanley Island.

Chart 1453.

Buoy.—A black light-buoy, 85 F, showing a *flashing white* light, opposite Clark Island light-buoy, marks the west extremity of the bank from Stanley and **Jacob Islands.** The width of the ship channel, here, between buoys 84 F and 85 F, is only 200 yards (182m9).

Dickerson Island, nearly 1½ miles east of Glengarry Point and on the south side of the ship channel, is separated from **Canal Island** by a narrow channel 20 feet (6m1) deep.

Grass Island, between Dickerson Island and Glengarry Point, is low and separated from the former by a broad and deep channel, and, from the latter by the ship channel, a quarter of a mile wide, and over 10 fathoms (18m3) in depth.

Light-buoy.—A black cylindrical light-buoy, 87 F, showing a *flashing white* light, is moored off the northeastern end of the shoal water extending northward of Grass Island.

Salmon River.—From Pointe Dupuis, the marshy irregular south shore of the lake trends in a general southwest direction 7 miles and then 3 miles nearly west to the mouth of Salmon River. From abreast Pointe Dupuis to the mouth of Salmon River and Round Island, there is an unbuoyed channel, narrowing in places to 150 yards, (137m2) through which more than the canal depth, 14 feet (4m3), can be carried. (*See* also page 104).

Salmon River can be navigated by small craft, drawing not more than 4 feet (1m2), to the International Boundary, where are situated the village of **Dundee,** in Quebec Province, and the village of **Fort Covington,** New York State.

Half a mile north of this river mouth is **Round Island,** with three others farther east, the easternmost and largest being heavily wooded and known as **Christatee Island,** and is a part of the St. Regis Indian reservation. There are, also, beween Pointe Dupuis and this last-mentioned island, ten small islands, all lying between the southeast shore and the unbuoyed channel previously mentioned.

Half a mile west of the mouth of Salmon River is **Hopkins Point** *(Lat. 45° 02′ N., Long. 74° 32′ W.)*, with an old wharf and a few cottages.

Local shallow-draught steamers, 80 feet (24m4) in length and 2 to 4 feet (0m6 to 1m2) draught, at one time ran from Cornwall to the Salmon River and up that stream to Dundee, calling at the wharves at St. Regis, Summerstown, Stanley Island, Hamilton Island, and Hopkins Point, and using the channel between Stanley and Little Hog Islands and across the flats to Hopkins Point.

St. Regis Village and **River.**—From the mouth of Salmon River, the shore runs in a general westerly direction, 6 miles to St. Regis River, which, with a depth at entrance of 6 feet (1m8), empties into the St. Lawrence River close east of the village. This shore is fronted by marshy, shallow flats, on the outer edge of which are several low islands, separated from each other and the main shore by narrow and usually deep channels. Close to the north side of these islands runs a deep, although, in some places, narrow, unbuoyed channel, connecting with the ship channel southeast of Glengarry Point.

St. Regis Village, on the west side of the mouth of St. Regis River, and marked by a stone church, in Canadian territory, is inhabited by Indians. The forty-fifth parallel of latitude, the International Boundary on the southeast side of the St. Lawrence River, between Canada and the United States, runs through the village. St. Regis wharf has 12 feet (3m7) of water alongside.

Chart 1453.

St. Regis Island, 100 feet (30m5) in height, 3 miles long northeast and southwest, and three-quarters of a mile in greatest breadth, occupies the middle of the St. Lawrence River between Glengarry Point and St. Regis Village; the channels round it are deep.

Light.—On the northwest side of St. Regis Island, one-half mile from its western end, a *fixed white* light is shown, at an elevation of 30 feet (9m1), from a mast with white diamond-shaped daymark attached.

Graveyard Point, on the northwest shore of the river, is situated a mile westward of Glengarry Point, the shore between, lined with scattered cottages, being slightly curved inward.

Farlinger Point lies a mile westward of Graveyard Point, the shore between forming a deep indentation.

Colquhoun Island, in two parts, lies 600 yards (548m6) southwest of Graveyard Point. The ship channel formerly led northward of the island, but is now between it and St. Regis Island. The lower portion of Colquhoun Island has a row of cottages along its southeast side. Boulders, dry at low water, extend about 400 yards (365m8) northeast from the lower end of the island.

St. Regis dyke is the name given to the cribwork, 500 feet (152m4) in length, built along the south side of the channel on the edge of the bank extending 400 yards (365m8) from the northeast extremity of Cornwall Island and marking the south side of the ship channel.

Leading Lights.—Front.—On the northwest end of the dyke is erected a white cylindrical steel structure, which, at a height of 18 feet (5m5), exhibits a *flashing white* light.

Rear.—On the southeast end of the dyke stands a similar structure and a *flashing white* light, elevated 30 feet (9m1). These lights in line, bearing 095½°, lead along the north edge of the shoal water from Cornwall Island. To clear this bank, the southeast light should be kept bearing 103°, and well open north of the front light.

The dredged cut, about 300 feet (91m4) wide, of which the dyke forms the southwest side, has a depth of over 14 feet (4m3).

The Crabs are three similar, round, bushy islets, without trees, about 7 feet (2m1) high, lying on the bar, which, with the exception of the cut above alluded to, connects Colquhoun Island to the northeast point of Cornwall Island. That nearest the latter, is known as **First,** the middle one, **Second,** and that nearest Colquhoun Island, **Third Crab.**

Buoyage.—The northern side of the St. Regis dyke dredged cut is marked by two red spar buoys; both the east and west approach to the cut are marked by a red light-buoy, showing a *flashing red* light, both moored, also, on the northern side of the channel.

Pilon Island *(Lat. 45° 02′ N. Long. 74° 40′ W.)*, half a mile long and a little less in breadth, lies close south-west of Farlinger Point and is separated from The Crabs by the old ship channel no longer used as such. From **Grays Creek,** in the bight north of Pilon Island, the north shore of the St. Lawrence River trends southwesterly 2 miles to a point at **St. Lawrence Park,** and thence nearly west half a mile to the entrance locks of Cornwall Canal.

Chart 1453.

Light.—On the northwest point of Pilon Island, about 2 miles below Cornwall, a *fixed white* light is shown, at an elevation of 30 feet (9^{m}1), from a mast with white diamond-shaped daymark attached.

Light-buoy.—St. Lawrence Park red cylindrical light-buoy, 102 F, showing a *flashing red* light, is moored at the edge of the shoal off the point one-half mile east of the canal entrance.

Cornwall Island of Canada (an Indian reserve) is 5 miles long east and west, its eastern and western portions being a mile in breadth. It extends 2$\frac{1}{3}$ miles below, and 1$\frac{1}{2}$ miles above the limits of Cornwall Town. A deep channel divides it from St. Regis Island and from the south shore. The New York Central Railway crosses to its western portion, and thence to the United States mainland shore, by two bridges. It is separated from Massena Point in United States territory on the west, by a narrow but deep channel, known as **Pollys Gut.** (*See* page 114).

Light.—A *fixed green* light is exhibited, at an elevation of 25 feet (7^{m}6), from a pole, situated on the northern side of Cornwall Island, about one mile eastward of the lower entrance to the Cornwall Canal.

Cornwall *(Lat. 45° 01′ N. Long. 74° 43′ W.)* by the Canadian National Railways, is distant 67 miles from Montreal, and 105 miles from Kingston. It has, also, connection by the same line with Toronto, and, with Ottawa and New York, by the New York Central Railway. It is also connected with the main line of the Canadian Pacific Railway at St. Polycarpe Junction, distant 29 miles. The population, in 1951, was 16,899.

Wharves.—On the north bank of the canal, and immediately west of the town, is a wharf, 1,170 feet (356^{m}6) long, with 14 feet (4^{m}3) of water alongside. On the river, at the foot of the north lock, is a wharf 500 feet (152^{m}4) long, with 9 feet (2^{m}7) of water alongside at low water. An old wharf is situated near the cotton factory, on the north bank of the river, two-thirds of a mile above the locks entrance.

Cornwall Canal.—The eastern entrance to this canal is distant from the western end of Soulanges Canal, 31 (28 nautical) miles by the ship channel, over which stretch there is not less than the canal depth, 14 feet (4^{m}3), and generally more. The Cornwall Canal was constructed to overcome Long Sault Rapids, its length to its western entrance at Dickinson Landing being 11 miles, with a width of 90 feet (27^{m}4) at the bottom and 154 feet (46^{m}9) at the water surface. It has six locks. At Cornwall, there are two entrance locks, but the northern and older one, with an available length of 175 feet (53^{m}3) and a width of 50 feet (15^{m}2), has but 9 feet (2^{m}7) on its sill, and is seldom used. The newer lock has 14 feet (4^{m}3) on the sill, as have the other five locks of the series, their dimensions being, available length 270 feet (82^{m}3), and breadth 43$\frac{2}{3}$ feet (13^{m}4). The lockage, or difference of surface level between the two ends of the canal, is 48 feet (14^{m}6). The canal is lighted by electricity. Vessels can berth temporarily in the old canal, and in broad space at the junction of the old and new, half a mile above the entrance. (For entering signals, and canal regulations, *see* page xxxv).

Prominent objects at the Cornwall entrance to the canal are chimney stacks, a high water tower and the towers of the power transmission cable.

Chart 1453.

Lights.—A *fixed red* light is exhibited from the northern and the southern entrance points of the eastern end of lock 15.

Bridge.—A railway bridge crosses the canal and river just west of Cornwall; it has been planked over so that automobiles may use it.

Radiotelephone.—A radiotelephone station, for the control of movements of shipping through the canal, is situated at Cornwall with the call sign CZ6G. Masters of radiotelephone-equipped vessels entering Bergin Lake from Lock 21 shall call station CZ6G and advise the Administration office if they are going to tie up anywhere within the canal boundaries.

The following frequencies are assigned to this station for communication with vessels.—

2182 Kc/s. For calling and distress purposes only.

2550 Kc/s. For transmission to United States ship stations after communication has been established on the calling frequency.

2582 Kc/s. For transmission to Canadian ship stations after communication has been established on the calling frequency.

The master of any radiotelephone-equipped vessel eastbound in the canal while passing Mille Roches bridge may, by calling CZ6G, obtain information as to whether or not the guard gate is ready to pass the vessel. It is important that masters of vessels use the frequency of 2182 Kc/s. for callying CZ6G only. Once communication has been established further transmissions must be made on the frequencies provided for that purpose on the ship's radiotelephone transmitter.

Charts 1452, 1453.

Directions, Soulanges Canal to Cornwall.—From the southwest entrance to Soulanges Canal, the course is 210° for three-quarters of a mile or until 100 yards (91^{m}4) southeast of red light-buoy 36 F, passing 60 yards (54^{m}9) on the same side of the breakwater light. From abreast light-buoy 36 F, haul westward and steer 238° for 4·6 miles, with McKies Point light fine on the starboard bow, until abreast light-buoy 43 F. On this course, a vessel will pass 150 yards (137^{m}2) southeast of red spar-buoy 38 F off St. Zotique, red light-buoy 40 F off Hay Point, and black spar 41 F marking the 11-foot (3^{m}4) middleground.

When rounding light-buoy 43 F, Cherry Island light, distant 7½ miles, will be seen, if the night be clear, a little open northwest of St. Anicet Shoal light-buoy, bearing 225°, which line clears Port Lewis flats, marked by black light-buoy 45 F. In the daytime, St. Zotique church in line with Hay Point bearing 043°, leads about 200 yards (182^{m}9) northwest of the same flats.

When abreast of black light-buoy 43 F, alter course to 216°, to pass 200 yards (182^{m}9) southeast of red light-buoy 48 F and 150 yards (137^{m}2) northwest of black light-buoy 45 F. Keep this course for 2·7 miles or until abreast red light-buoy 48 F. From this position, the course for 6 miles is 235°, passing not less than 100 yards (91^{m}4) northwest of two black spar buoys and St. Anicet Shoal black light-buoy, 57 F, 150 yards (137^{m}2) southeast of red light-buoy 60 F and 240 yards (219^{m}4) southeast of red light-buoy 68 F marking the east end of Island Bank, and the southernmost of all lights seen in that direction.

Charts 1452, 1453.

When abreast St. Anicet Shoal black light-buoy 57 F, the Island Bank red light-buoy 68 F should be seen on the starboard bow, with Cherry Island a point on the port bow. When abreast red light-buoy 68 F, alter course and be guided by the buoys, marking the narrow but deep passage 200 yards (182m9) wide, called South Gully, steering 268°, for about one mile so as to pass 200 yards (182m9) south of Island Bank light-buoy 68 F, and between red spar buoy 70 F, and Lancaster Bar black light-buoy 69 F. Thence, haul very gradually southward and pass between Lancaster Bar lighthouse, and the red light-buoy moored opposite it on the north side of the channel. From the position abreast of Lancaster Bar light, haul gradually southward to a course 229°, steering for Lancaster lighthouse on the northwest side of the channel, for 2⅓ miles, or until within a quarter of a mile of that light, and the same distance above black spar buoy 77 F, passing 100 yards (91m4) northwest of black spar buoy 71 F, the same distance southeast of red light-buoy 76 F, and 250 yards (228m6) southeast of red spar 74 F.

From this position, haul southward, and steer 206°, with Squaw Island red light-buoy 78 F, a little on the starboard bow, for 1½ miles, until 100 yards (91m4) southeast of that buoy. Now haul westward and steer 226°, for 2·2 miles with St. Francis Middleground lighthouse as much on the port bow as Hamilton Island lighthouse is on the starboard bow, until 150 yards (137m2) south of the latter lighthouse. On this course, care must be taken to keep north of Horseback Shoal, with 12 feet (3m7) of water over it, marked by a black spar buoy, half a mile southwest from Squaw Island light-buoy 78 F. The course passes 200 yards (182m9) southeast of the red spar buoy 80 F, on Highlander Shoal (*see* page 105). The water is deep close to the north side of St. Francis Middleground light. From the position off Hamilton Island light, steer 234° to leave black light-buoy 83 F, on the port hand, and with Clark Island red light-buoy 84 F, fine on the starboard bow, for half a mile, when the vessel should be nearly midway between black light-buoy 83 F and red spar buoy 82 F.

Clark Island light-buoy 84 F should now be brought fine on the port bow, the vessel steering 239° for a little over three-quarters of a mile, or until 70 yards (64m0)) northwest of Stanley Island wharf. Thence, the same light-buoy may be steered for, until abreast the southwest end of Jacob Island, when a vessel should alter course to pass in mid-channel between it and black light-buoy 85 F, the width here, between the buoys, being only 200 yards (182m9). From this position, the course is 255°, for 1·8 miles, until 70 yards (64m0) north of Grass Island black light-buoy 87 F.

Hence, a vessel must turn southward, and steer 242° for St. Regis dyke southeast light. After running on this course for 3·3 miles, passing 100 yards (91m4) southeast of Glengarry Point red light-buoy 88 F, the vessel should be up to the southeast entrance of St. Regis dyke dredged cut. Haul up westward to pass through this cut with the dyke and its two lights on the port hand, and the four red buoys on the starboard hand. When through, steer 283° with St. Regis dyke southeast, and higher, light well open northeast of the front light, for a mile, whence, keep midway between the main shore and the northwest coast of Cornwall Island, until up to the entrance to Cornwall Canal.

Cornwall to Soulanges Canal.—After leaving Cornwall Canal, keep midway between the north coast of Cornwall Island and the north mainland shore, for 1⅓ miles, or, until St. Regis dyke southeast light is seen well open northeast of the front light, bearing 103°. These should now be steered for, one mile. Pass through the cut, with two red light-buoys and two red spar buoys on the port, and the dyke with its two lights on the starboard hand.

Charts 1452, 1453.

On leaving the cut, steer 062°, passing 100 yards (91m4) from Glengarry Point red light-buoy 88 F. After running on this course 3·3 miles, a vessel should be abreast of Grass Island black light-buoy 87 F, which should be left 70 yards (64m0) on the starboard hand, and a course steered for 1·8 miles, with Clark Island red light-buoy 84 F a little on the port, and black light-buoy 85 F opposite it, on the starboard bow.

Pass midway between these two buoys, and steer 050° for the northern of three huts on Renshaw Island for half a mile, or until Stanley Island light is 70 yards (64m0) on the starboard beam. Hence, steer 059° for a little over three-quarters of a mile, until abreast of Renshaw Island red spar buoy 82 F, leaving black light-buoy 83 F on the starboard hand. Now, haul northward and steer 054° for half a mile, until abreast of Hamilton Island light, distant 150 yards (137m2). Hence, steer 046°, with St. Francis Middleground light on the starboard, and Squaw Island red light-buoy 78 F on the port bow. After running on this course for 2·2 miles, a vessel should be 100 yards (91m4) southeast of the latter buoy, having passed 70 yards (64m0) northwest of St. Francis Middleground lighthouse, and 200 yards (182m9) southeast of Highlander Shoal red spar buoy. After passing the latter, borrow a little northward, to make sure of passing northwest of Horseback Shoal, with 12 feet (3m7) of water on it, and marked by a black spar buoy.

From the position southeast of Squaw Island light-buoy 78 F, steer 026° with Lancaster lighthouse a little on the port bow. After running 1½ miles on this course, or until a quarter of a mile below Lancaster light, and between Lancaster lighthouse and Lancaster Bar lighthouse, an 049° course should be kept for nearly 2⅓ miles, with Lancaster Bar light a little on the starboard bow, until down to black spar buoy 71 F. This course will pass 250 yards (228m6) northward of black spar buoy 77 F, 100 yards (91m4) southeast of red light-buoy 76 F, and 250 yards (228m6) southeast of red spar buoy 74 F.

Pass 100 yards (91m4) northwest of black spar buoy 71 F, the same distance on the same side of Lancaster Bar lighthouse, and gradually turn eastward, guided by the buoys, to pass through the channel only 200 yards (182m9) wide, known as South Gully, steering 087° and passing between black light-buoy 69 F and red spar 70 F. On arriving 200 yards (182m9) south of Island Bank red light-buoy 68 F, a vessel may gradually alter course to steer 055° for St. Anicet Shoal black light-buoy, distant 3¾ miles, passing 150 yards (137m2) southeast of red light-buoy 60 F.

Passing 100 yards (91m4) northwest of St. Anicet Shoal black light-buoy, steer, with Pointe Mouillée Flats red light-buoy, 48 F, a little on the port bow, 055°, for 2⅓ miles, or, until 200 yards (182m9) southeast of that buoy. From this position, the black light-buoy 43 F, lying half a mile above an 11-foot (3m4) middleground northeast of Port Lewis Flats, should be seen, and kept on the starboard bow, the vessel steering 036° for 2·7 miles, or until abreast buoy 43F, distant 250 yards (228m6).

Cherry Island light, kept well open northwest of St. Anicet Shoal black light-buoy, 225°, leads just clear of the Port Lewis Flats. In the day time, St. Zotique church in line with Hay Point bearing 043° leads northwest 200 yards (182m9) of these flats.

From the last position, gradually haul to the eastward to bring McKies Point light astern, steering 058° for 4·6 miles, and heading nearly on red light-buoy 36F , until that buoy is reached. Pass 150 yards (137m2) southeast of red light-buoy 40F and red spar buoy 38F, lying south of St. Zotique, and 100 yards

Charts 1452, 1453.

(91^{m}4) southeast of light-buoy 36F, when an 030° course, for seven-eighths of a mile, should take a vessel to the entrance to Soulanges Canal, passing 60 yards (54^{m}9) southeast of the breakwater red light.

If proceeding to the wharves at Coteau Landing, pass 100 yards (91^{m}4) east of red light-buoy 36F, and pass 200 yards (182^{m}9) northwest of the middle-ground red and black horizontally-striped buoy 32F.

If proceeding from the wharves to the canal, pass close northeast of the middleground red and black spar buoy, and 150 yards (137^{m}2) southwest of the breakwater red light, and when the line of the Soulanges Canal range lights is crossed, haul up to 034°, keeping a little southeast of the line of these lights, as before directed.

If bound to Valleyfield, proceed by the main channel until half a mile below Pointe Mouillée Flats red light-buoy 48F, whence Grenadier Island (*See* page 100) should be kept a little on the starboard bow, the vessel steering 072° for 3·5 miles to a position about 300 yards (274^{m}3) north of that island. This course crosses the Port Lewis Flats with 10 feet (3^{m}0) of water, sufficient for a vessel berthing at Valleyfield. From Grenadier Island, the course and distance to Grosse Pointe red spar buoy, 25 F, is 047°, nearly 5 miles.

CHAPTER VII

CORNWALL TO ROCKPORT AND ALEXANDRIA BAY

Chart 1455.

Dickinson Landing *(Lat. 45° 00′ N., Long. 74° 55′ W.).*—**Light.**—The western end of Cornwall Canal is near Dickinson Landing, where there is a wharf with over 14 feet (4m3) of water alongside it. On the outer end of the guard pier on the south side of Cornwall Canal is erected a white square wooden building, which, at a height of 21 feet (6m4), exhibits a *fixed red* light. (For canal signals and regulations *see* page xxxv).

Sheek Island, in the Province of Ontario, is situated with its northeast side nearly midway between Cornwall and Dickinson Landing, and forms part of the south side of the Cornwall Canal. It is 2¼ miles in length, and the broader and deeper water on its northern side known as **Bergin Lake** is utilized instead of the old canal north of it. The villages, **Mille Roches** and **Moulinette,** a mile apart, and stations on the Canadian National Railways, occupy the main shore of this reach, the first named village having a population of about 650.

Lights and buoys.—Four *fixed amber* lights and one *fixed white* light, the latter being the westernmost, mark the north edge of Sheek Island. A *fixed white* light marks the eastern end of the old canal wall and a similar light is shown on the northeast bank of the canal about 1,800 feet (548m7) southeastward of the latter light. A *flashing red* and *fixed red* and *green* light is exhibited on the south bank of the canal, about three-quarters of a mile southeastward of the water tower at Mille Roches. A *fixed amber* light marks the eastern side of the opening in the old canal wall at Moulinette, and a similar light is shown from this wall about 3,800 feet (1158m2) eastward of the above opening. Two black spar buoys with white reflectors mark the edge of the bank extending from the northeastern end of Sheek Island.

Long Sault Island, in the State of New York, extends above and below Dickinson Landing, the total length being nearly 4 miles. **Wagner** and **Grassy** Islands lie between the middle of the island and Dickinson Landing. It is separated from Sheek Island by Long Sault Rapids, through which 7 feet (2m1) of water can be carried.

Warning.—Owners of large and medium-sized pleasure craft, who navigate the St. Lawrence River between Cornwall and Prescott, are warned not to attempt to navigate the Long Sault Rapids. Passage through these rapids is definitely dangerous for craft of this type.

Croil Island, in United States waters, is situated between Long Sault Island and Farran Point Canal being divided from the former by a deep water channel known as **Big Sny** with a black buoy marking the northern entrance. A bank, with 2- and 4-foot (0m6 and 1m2) shoal spots on it, extends half a mile eastward from the northeast point of Croil Island.

American or **South Channel.**—From St. Regis Island (*see* page 108), a deep, unbuoyed channel passes south of Cornwall Island, between the latter and the United States shore, rejoining the main stream at the head of the island, in Polly Gut (*see* page 109). The International Boundary between Canada and

Chart 1455.

the United States follows this channel closer to the Cornwall Island shore. On the south shore of this channel, 2⅓ miles above St. Regis wharf, is the mouth of a shallow stream, called **Raquette River.** North 500 yards (457m2) from the west entrance point of the latter is a rocky shoal, with one foot (0m3) of water over it, the only danger in this channel. A bridge of the New York Central Railway crosses the channel near its upper end, with a width of 360 feet (109m7) between the piers of its middle span and with a clearance of 37½ feet (11m4) at high water level. Half a mile south of Pollys Gut is the mouth of **Grass River,** a stream navigable for 5½ miles to the St. Lawrence River Power Company's wharf at **Massena,** with a channel 200 feet (61m0) wide and a depth of 8 to 12 feet (2m4 to 3m7) depending upon the flow through the power house. Four and a half miles above its mouth, at Massena Center, a suspension bridge spans the river with a clearance of 51 feet (15m5). As this portion of the Grass River is used as the tailrace for the above company's power plant, it has a current of from 3 to 3½ knots.

Crab Island Shoal *(Lat. 45° 00′ N., Long. 74° 47′ W.)*—About half a mile east of Barnhart Island, in the middle of the river, lies Crab Island Shoal, a rocky bank with one foot (0m3) of water on its shoalest spot.

Barnhart Island, about 3 miles long, and in United States territory, lies southeast of Sheek Island, separated from the latter, and also from the south bank of the Cornwall Canal by a series of rapids. South of Barnhart Island and separating it from the United States mainland shore is a narrow, winding channel about 4 miles long, 300 to 500 yards (274m3 to 452m2) wide, and from 3 to 9 fathoms (5m5 to 16m5) deep. In its east entrance is an unbuoyed shoal with 9 feet (2m7) over it. A channel, south of the shoal with a depth of 13 feet (4m0), is marked by two daymarks on the Canadian side at lock No. 19 of the Cornwall Canal. At a sharp bend half-way up the channel the south shore forms a shallow bay, known as **Robinson Bay.** The upper end of the channel, between Barnhart and Long Sault Islands, becomes the foot of the Long Sault Rapids. Throughout its length the current is swift, and it is used by light draught vessels running the above rapids, but should not be attempted without pilot, or long acquaintance with the river.

An aerial cableway crosses the channel south of Barnhart Island from the southeast point of that island to the south shore. The minimum vertical clearance is 52 feet (15m8) under the carriage and 65 feet (19m8) under the cable.

At the foot of Long Sault Island, the channel just described is joined by another which flows south of the above island from the Big Sny Channel at its head (*see* page 114). It is known as **South Sault Rapids,** has depths of 8 feet (2m4) and less, narrows in places to a width of only 100 yards, (91m4) and a 5½-knot current makes it unfit for navigation. Two-thirds of a mile east of its upper end is situated the head of the Massena Power Canal, where a submerged weir is built across the channel just below the entrance to the canal.

Massena Power Canal.—A wing dam extends from **Talcotts Point,** a projection of the south shore at the extreme head of the South Sault Rapids Channel, which, with a number of cribs, obstructs the greater part of the passage here, leaving only a dredged channel, 150 feet (45m7) wide and 14 feet (4m3) deep, by the aid of which vessels can make the entrance to the Massena Power Canal. There is a swift current across the head of this channel and care must be taken to prevent vessels intending to enter it from being carried past. The canal is navigable and leads for 2¾ miles to Massena, having a width of 210 feet

Chart 1455.

(64m0) at the waterline, a least depth of 20 feet (6m1), a current of 3 knots, and minimum headroom of 50 feet (15m2) under the lowest of the three bridges crossing the canal.

Richards Landing lies 1½ miles above the head of the Massena Canal. The water close to the shore is deep.

Cat Island *(Lat. 44° 57′ N. Long. 75° 01′ W.)*, in United States waters, two-thirds of a mile long, is separated from the southwest extremity of Croil Island by a channel 150 yards (137m1) in breadth.

Buoy.—A black spar buoy marks the bank extending 250 yards (228m6) from the northwest side of the island.

Vessels westward bound, and not using Farran Point Canal, pass through Big Sny, between Croil and Long Sault Islands, and between Cat and Croil Islands.

Delany and **Archibald Shoals.**—Delany Shoal, with a depth of 13 feet (4m0) over it, lies 200 yards (182m9) off Dawson Point. Archibald Shoal, half a mile farther westward, has a depth of 9 feet (2m7), rock bottom, but this spot lies well inside the light-buoy.

Light-buoys.—Each shoal is marked by a red cylindrical light-buoy, showing a *flashing red* light, and numbered 6 U and 8 U, respectively.

Buoy.—Maxwell Shoal lies nearly in mid-channel, almost one-half mile above Archibald Shoal light-buoy. It is an isolated spot with 14 feet (4m3) least depth, close to the shorebank extending from the northeast point of Croil Island. A black light-buoy, 11 U, showing a *flashing white* light, is moored on the north edge of the shoal.

Farran Point Village, with a population of about 400, is situated at the lower entrance to the canal of that name, and is a station on the Canadian National Railways, being distant from Montreal 82, and from Kingston 93 miles.

Buoy.—In the 3 miles of natural water between the northeast point of Croil Island and the lower entrance to Farran Point Canal, the shores (especially the Canadian shore) are fairly clean, only one red spar buoy No. 38 U being placed off the Canadian shore, here known as Graveyard Point, three-quarters of a mile from the canal entrance.

Graveyard Point lights.—From a lantern on a pole, situated on the shore three-quarters of a mile below Farran Point Village, a *fixed white* light is shown at a height of 40 feet (12m2).

About a quarter of a mile westward of the above light, a *fixed red* steering light is exhibited at an elevation of 30 feet (9m1).

Current.—The rate of the current in the channel north of Croil Island is about 3 knots, and, in Farran Point Rapids, the rate is 7 to 8 knots.

Farran Point Canal.—The lower entrance to this canal is distant from the entrance to Cornwall Canal at Dickinson Landing, 5 miles by the natural channel, with 5 to 7 fathoms (9m1 to 12m8) of water. This canal overcomes Farran Point Rapids west to Croil Island, but which are navigated by all eastern or downbound vessels, there being plenty of water by keeping near the canal embankment. The length of the canal is 1¼ miles, the lockage being done by either of two locks side by side, at the lower end. The newer, and western, lock is 800 feet (243m8) long, and 50 feet (15m2) broad, with 16 feet (4m9) of water

Chart 1455.

on the sill. The older lock has the same breadth, but the length is only 200 feet (61^{m}0) and depth on sill, 9 feet (2^{m}7). The lockage, or difference of level between the surface of the river at the ends of the canal, is 4¼ feet (1^{m}2). (For signals, details, and regulations, *see* pages xxxvi and xliii).

Light.—A *fixed red* light is exhibited, at an elevation of 30 feet (9^{m}1), from a mast with a daymark, situated about 1,000 feet (304^{m}8) southward of the lower lock.

Light-buoy.—For the benefit of vessels proceeding eastward through Farran Point Rapids, a red cylindrical light-buoy, 40 U, showing a *flashing red* light, is moored 150 yards (137^{m}2) southeast of the upper entrance of the canal, and vessels pass southeast of it.

Buoy.—A red spar buoy, 42 U, lies 150 yards (137^{m}2) west of the entrance of the canal, and must be left on the port hand, in entering the canal from the southwest.

Caution.—Risk of collision.—Eddy.—Vessels using the canal in ascending generally keep close to the northwest coast of Croil Island, to avoid the strength of the current, which is quite 3 knots. In doing this, it is not easy to see, or be seen by, a downbound vessel; caution should therefore be exercised to avoid collision. A vessel upbound should cross to the main shore in time to take the canal end on, taking care to check down in time, as a strong eddy runs toward the canal entrance.

Steen Island *(Lat. 44° 57′ N. Long. 75° 02′ W.)* in Canada, half a mile long and 400 yards (365^{m}8) wide at its southwest end, lies close to the Canadian shore, abreast Aultsville, its eastern point being three-quarters of a mile above the entrance to Farran Point Canal.

Aultsville, on the north shore opposite Steen Island, is a station on the Canadian National Railways. There is a small wharf, 52 feet (15^{m}8) long, jutting out into the river 60 feet (18^{m}3), with 15 feet (4^{m}6) of water at the outer face.

Light-buoy.—A red cylindrical light-buoy, 44 U, showing a *flashing red* light, lies 300 yards (274^{m}3) northeastward of the south point of Steen Island.

Shoal.—A shoal, with a least depth of 14 feet (4^{m}3), rock, lies 250 yards (228^{m}6) south of the south point of Steen Island.

Sturgeon Shoal, with less than 6 feet (1^{m}8) of water over it, extends a quarter of a mile from the south shore, one-half mile westward of the south point of Steen Island.

Buoy.—A black can buoy, 45 U, is moored at the extremity of the reef.

Weaver Point, on the north shore, is situated 2⅓ miles westward from the south point of Steen Island, the shore immediately east of Weaver Point forming a bight. From the shore between the latter and Steen Island, a shallow bank extends off, 200 yards (182^{m}9). The village a little back from Weaver Point is known as **East Williamsburg.**

Light-buoy.—A red cylindrical light-buoy, 50 U, about 100 yards (91^{m}4) from the point, and showing a *flashing red* light, marks the south end of this bank off Weaver Point.

Chart 1455.

Bradford Point, on the south shore, is situated 4¼ miles westerly from Louisville Landing, the shore being indented by three principal bays, one of which, three-quarters of a mile east of Bradford Point, contains two small islands. The eminence, a little back of the point, is known as **Bradford Hill.**

Chart 1456.

Prunner Shoal.—Buoys.—The projection of the north shore, half a mile west of Weaver Point, is named **Cook Point,** and, from the shore, for one mile westward of Cork Point, a shallow rocky bank extends 300 yards (274m3). This shoal is marked by two red buoys, the eastern being a red spar buoy, 52 U, fitted with a radar reflector, off Cook Point, and the western a red cylindrical light-buoy, 54 U, showing a *flashing red* light, a quarter of a mile farther upstream. Another red spar buoy is moored northwestward of the lower end of Crysler Island. A black light-buoy, showing a *flashing white* light is moored off the northern end of Crysler Island.

Current.—The rate of the current in this locality is about 3 knots.

Crysler Island of the United States, lying rather nearer the southeast shore, is a third of a mile long northeast and southwest by a quarter of a mile in breadth, its eastern side being 1·3 miles above Weaver Point.

Bank.—Buoy.—A bank extends 500 yards (457m2) easterly from the east side of Crysler Island; the northeast extreme is marked by a black can buoy.

Strawberry Island, 350 yards (320m0) southwest of Crysler Island, has a bank, extending from its southeast extreme.

The passage south of Crysler and Strawberry Islands is not used by heavy draught vessels.

Goose Neck Island, in United States waters, 1½ miles in total length, and three-quarters of a mile in breadth, has its eastern side separated from Strawbery Island by a channel suitable for vessels of light draught.

Light-buoys.—The east end of the bank from the northeast point of Goose Neck Island is marked by a black buoy, 67 U, showing a *flashing white* light; and, another black buoy, 69 U, also showing a *flashing white* light, marks the edge of the bank extending north from the northwest side of the island.

Jackass Shoal.—Buoys.—This shoal with 5 feet (1m5) of water over it is 300 yards (274m3) from the Canadian shore half a mile southwesterly from the northwest point of Goose Neck Island. On the east side of the shoal is moored a red cylindrical light-buoy, 72 U, showing a *flashing red* light; a red spar buoy, 74 U, marks the edge of the 2-fathom (3m7) line, 700 feet (213m4) southwestward of Jackass Shoal. A depth of 9 feet (2m7) can be carried between Jackass Shoal and the Canadian shore.

Doran Point lies 1¾ miles southwest of the northwest point of Goose Neck Island and three-quarters of a mile northeast of the Morrisburg entrance to Rapide Plat Canal. Marking the southern edge of the bank with 3 feet (0m9) of water on it, extending 300 yards (274m3) from this point, is a red light-buoy, 82 U, showing a *flashing red* light; 300 yards (274m3) westward of 82 U is moored a red spar buoy, also indicating the south edge of the shorebank.

Current.—The current abreast of **Doran Island** *(Lat. 44° 54′ N. Long. 75° 09′ W.)* and between it and Morrisburg, has an estimated rate of 5 knots.

Chart 1456.

Morrisburg, which, in 1951, had a population of 1,855, is situated at the eastern entrance to Rapide Plat or Morrisburg Canal and, is distant, by the natural channel, 9½ miles from the western entrance to Farran Point Canal.

This, the deeper channel, passes northward of Crysler, Strawberry, Goose Neck, and Doran Islands. On the Canadian side, half a mile and 1¾ miles, respectively, westward from Cook Point, are two bays into which flow small streams. From the western one, known as **Cook Bay,** the shore runs straight southwesterly 3 miles to Doran Point. Close westward of this point is the mouth of a creek.

Morrisburg is a station on the Canadian National Railways, distant from Montreal and Kingston, thereby, 92⅓ and 82¾ miles, respectively, and on the main highway bordering the St. Lawrence River. A ferry steamer runs between Morrisburg and Dry Island, New York State.

Wharf.—The Government wharf has a landing head 90 feet (27m4) long, and face 40 feet (12m2) in length; along the face is a depth of 15 to 17 feet (4m6 to 5m2), and in the berth on the west side, 90 feet (27m4) long, a depth of 9 to 10 feet (2m7 to 3m0).

Ogden Island, in the State of New York, is 2½ miles in length, the middle portion being two-thirds of a mile in breadth. Its southwest end is situated a third of a mile above the upper entrance to Rapide Plat Canal, and, its lower end reaches to within a mile of Morrisburg. Between Bradford Point (*see* page 118) and the lower end of Ogden Island, the United States shore is broken up into several points and bays, that south of the southeast extremity of Goose Neck Island being known as **Cole Creek.** The streams 1½ miles and two-thirds of a mile below Ogden Island are named, respectively, **Brandy** and **Little Sucker** Brooks. Between Goose Neck and Ogden Islands are six other islands, named from the northeast, **Indian,** Doran (*see* page 118), **Murphy, Dry, Clark,** and **Canada** Islands. The last lies three-quarters of a mile southwesterly from the lower entrance of Rapide Plat Canal, and 300 yards (274m3) south of the canal bank. Indian and Doran Islands, in Canadian waters, lie one-quarter and one-half mile, respectively, west of the south point of Goose Neck Island, the ship channel being north of them.

Light-buoy.—A black light-buoy, showing a *quick flashing white* light, is moored off the north end of Clark Island.

A small unbuoyed shoal, with 5 feet (1m5) of water over it, lies 350 yards (320m0) northeast of Doran Island.

The northwest coast of Ogden Island is shallow, a bank with only 4 feet (1m2) of water on it, known as **The Shelves,** extending two-thirds of the way across the ship channel at the distance of a little over three-quarters mile below the upper entrance to Rapide Plat Canal. To avoid this, downbound vessels must keep the canal embankment close aboard.

Light-buoy.—A black light-buoy, showing a *quick flashing green* light, is moored northward of the northeastern extremity of Ogden Island.

Leishman Point lies close west of the upper end of Ogden Island, the St. Lawrence River, here, being a quarter of a mile wide, and the navigable channel about half that width.

Waddington is separated from Ogden Island by a shallow, bridged and dammed channel, named **Little River.** It is 2 miles east of Leishman Point. A quarter of a mile below Waddington is a stream named Great Sucker Creek.

Chart 1456.

There are two landings for light draught boats, one on Ogden Island at the end of the upstream side of the bridge, and the other about a mile below the dam. The channel to the landing above the bridge is narrow and from the head of Ogden Island to abreast the landing will accommodate boats drawing 4 to 5 feet (1m2 to 1m5) of water; it has neither lights nor buoys. The lower wharf has an approach from the main channel of the river at Dry Island, allowing the landing of boats drawing 14 feet (4m3) of water; it is marked by three red spar buoys. Just west of the lowest buoy is a spot with only 4 feet (1m2) of water over it.

Rapide Plat, or **Morrisburg Canal,** with its northeast entrance at Morrisburg (*Lat. 44° 54′ N., Long. 75° 11′ W.*) is 3⅔ miles long, has a lock at each end 270 feet (82m3) long and 45 feet (13m7) broad, and a depth of 14 feet (4m3) on the sills. The lockage or difference of level of the river at each end of the canal, is 11½ feet (3m5). Vessels proceeding northeast, or down the river, do not, if the water level is good, use the canal, but run the natural channel in the rapids between Ogden Island and the canal embankment, keeping close to the latter, the coast off the central portion of Ogden Island being shallow. The fast, shallow draught boats stem these rapids, when westbound. Local pilots are necessary for this.

Light.—A *fixed red* light is shown from the end of the pier at the upper entrance to the canal.

Light-buoys.—A black light-buoy, showing a *flashing white* light, is moored 1,300 feet (396m2), 216°, from the end of the pier at the head of the Morrisburg Canal.

A black light-buoy, showing a *flashing white* light is moored about 3,100 feet (944m9), 095°, from the same pier.

Iroquois, at the northeast, or lower entrance to Galop Canal, had, in 1951, a population of 1,086, and is 4 miles southwest of the upper entrance to Rapide Plat Canal. It is a station on the Canadian National Railways. Boats drawing 5 feet (1m5) can lie at the dock below the locks.

Iroquois leading lights.—The *fixed red* front light is exhibited, at a height of 35 feet (10m7), about 700 feet (213m4) northeastward of the lower entrance to the Galop Canal.

The *fixed red* rear light is exhibited, at a height of 65 feet (19m8), about 675 feet (205m8), 351°, from the front light.

Light.—On **Robertson Point,** a mast at a height of 25 feet (7m6), shows a *fixed red* light.

Light-buoy.—A red light-buoy, showing a *flashing red* light is moored 2,900 feet (883m9) 224°, from the above light.

Pinetree Point, situated between the Rapide Plat and Galop Canals, is the most prominent projection on that shore. Two creeks discharge into the bight between Pinetree Point and Iroquois, and a bank extends offshore for 400 yards (365m8).

Light.—On Pinetree Point a mast, at a height of 25 feet (7m6), exhibits a *fixed red* light.

Current.—At Pinetree Point, the current runs with a rate of about 5 knots.

Chart 1456.

Point Rockway *(Lat. 44° 50′ N. Long. 75° 18′ W.)*, on the United States shore, is situated opposite the lower entrance to Galop Canal, the banks from either side being separated by a channel, with depth over 20 feet (6m1). Point Rockway is distant 3 miles southwesterly from Leishman Point. Off the shore of the bay, half a mile southwest of the latter point, a bank, with 4 feet (1m2) of water on it, stretches a quarter of a mile.

Light-buoy.—A black light-buoy, showing a *flashing white* light, is moored close northwestward of Point Rockway.

Anchorage.—Between **Waddell Point** (on the United States shore) and Point Rockway, about 1·4 miles southwestward, there is good anchorage out of the current.

Galop Canal.—The lower or northeast entrance to this canal is at Iroquois Village, the canal being built to overcome the rapids at Iroquois Point, Cardinal, and the Galop. The length of the canal is 7½ miles, length and breadth of locks, 270 and 45 feet (82m3 and 13m7), respectively, with a depth of 14 feet (4m3) on the sills. The lockage, or difference of level of the river surface at each end of the canal, is 15½ feet (4m7). Vessels proceeding to the northeast, or, down the river, use the natural channel from the foot of Galop Rapids, leaving the canal by the lock No. 28, abreast the upper lock for southwest bound vessels, and three-quarters of a mile below Galop Canal light (*see* page 122). The northwest side of the canal, between Iroquois and Cardinal, is marked by red spar buoys.

Iroquois Point is situated on the Canadian side, three-quarters of a mile southward from the lower entrance of Galop Canal, the latter, half a mile back, having changed the former peninsula to an island.

Light-buoy.—A black light-buoy, showing a *flashing white* light, is moored on the edge of the 14-foot (4m3) spot about 400 yards (365m8) southwestward of Iroquois Point.

Soussaint Island with **Presqu'ile** close northwest of it, lies a mile above Iroquois Point, the canal having also made an island of Presqu'ile.

Light-buoys.—Toussaint Island is surrounded by a shallow bank, which is marked on the southeastern side by a red buoy, showing a *flashing red* light, and on the southwestern side by a red boat-type buoy, showing a *flashing red* light.

A black light-buoy, showing a *quick-flashing white* light, is moored about 700 feet (213m4) southward of the latter buoy.

Sparrowhawk Point, in New York State, lies 600 yards (548m6) southwest of Toussaint Island, the channel for vessels bound down passing between them. The United States shore between Rockway and Sparrowhawk Points forms a deep bight, from the northeast part of which, abreast **Tilden Village,** a shallow bank extends nearly a quarter of a mile, and is not buoyed.

Light-buoy.—A black light-buoy, showing a *flashing white* light, is moored close westward of Sparrowhawk Point.

Cardinal, with a population of 1,782 in 1951, is situated on an island formed by the Galop Canal, which skirts its north side. The old canal, which passed south of Cardinal, is now used as a harbour and landing place for vessels drawing not more than 8 feet (2m4). The area in front of the Canada Starch Company's wharf and channel to the main river channel have been dredged to a depth of 13 feet (4m0).

Chart 1456.

Frazer Shoal, awash in places, is an isolated bank, a third of a mile long northeast and southwest, by 400 yards (365m8) wide, lying northwestward of the ship channel, and half a mile northeast of Cardinal.

Light-buoy.—The southeast extremity of Frazer Shoal is marked by a red light-buoy, showing a *flashing red* light, and lying 053°, distant 0·8 mile, from the entrance to Cardinal Harbour.

Chart 1457.

Galop Island is the central and largest of the group belonging to the United States, extending from Cardinal to the upper entrance to North Channel (*see* page 123), the rapids, having the name of the island, running between its northern coast and the canal embankment. The eastern of the eight islands northeast of Galop Island is named **Lotus,** and, the western, **Dixon Island.**

Light-buoys.—The bank off the western side of Lotus Island is marked by two black light-buoys, showing *flashing white* lights. The upper buoy being *quick flashing.*

Current.—In the **Galop Rapids,** the rate of the current is estimated to be 9 knots. The canal was constructed to enable vessels ascending the river to pass the Galop Rapids. Descending vessels run the rapids safely, except at extreme low stages of water in the river, when downbound vessels of full canal draught must use the canal.

Light-buoy.—Marking the edge of a shallow bank, extending 200 yards (182m9) northward from Dixon Island, is a black light-buoy, 127 U, showing a *flashing white* light.

The shallow channel southeast of Galop and the islands above mentioned is termed the **American Galop Rapids.**

Adams Island *(Lat. 44° 46′ N. Long. 75° 25′ W.),* in Canada, a quarter of a mile long, northeast and southwest, is situated between the northwest extreme of Galop Island and the upper entrance to Galop Canal.

Gut Dam, between Galop and Adams Island, was removed in 1952. Some cribs remain.

Lights.—Head of Galop Canal.—The upper entrance to Galop Canal is 300 yards (274m3) north of Adams Island, and on the shore abreast the upper entrance to the canal a *fixed red* light is shown, at an elevation of 20 feet (6m1), from a lantern on a small red, skeleton tower. The light is unwatched.

A light, *fixed amber,* is exhibited from a pole with a white diamond-shaped daymark attached, situated on the shoreline about 580 yards (503m3), 276°, from the *fixed red* light at the head of Galop Canal.

Buoys.—Westward from the canal entrance, and northward of Adams Island, are placed two red buoys 138 U and 142U, both showing *flashing red* lights; three red spar buoys 134 U, 136 U, and 140 U, two boat type black buoys, 141 U and 143 U, showing *flashing white* lights, and two black spar buoys 139 U, and 137 U. Vessels from the canal to North Channel (*see* below) pass northward of the latter, and south of the light-buoys 138 U and 142 U, and the red spar buoys.

Charts 1444, 1457.

North Channel dykes.—Light.—Two-thirds of a mile southwest of the canal entrance are built two cribwork piers, or dykes, each 500 feet (152^{m}4) long, and, between which, is the channel. On the angle of the northwestern dyke is erected a white structure, carrying a *flashing red* light, at a height of 26 feet (7^{m}9).

Light-buoy.—A black light-buoy, 143 U, showing a *flashing white* light, is moored 550 yards (502^{m}9) below the above light.

Current.—Between the dykes and in North Channel, the rate of the current is about 3 knots.

North Channel.—Southwestward of Galop Island is a group of islets, the northwestern two being known as **Drummond** and **Spencer** Islands, in Canadian waters. The southwestern one of the group, belonging to the United States, is named **Chimney Island.** North Channel a cutting 300 feet (91^{m}4) wide and 16 feet (4^{m}9) deep, passes between Drummond and Spencer Islands; also between **Duck Island** and **Tuttle Point.** The length of this channel, including North Channel dykes, is 2½ miles.

Lights.—On each revetment wall, on the north and south sides of North Channel, and near the upper end of the dredged cut is erected a red, steel, skeleton tower that, from a height of 12 feet (3^{m}7), exhibits a *flashing* light; the light on the north wall is *red* and that on the south wall *white*. The lights are unwatched.

From the southern end of Spencer Island, a pier extends in a general southwest direction half a mile, the channel being close southeast of this pier.

At the bend of the pier, a red, steel skeleton tower shows, at a height of 12 feet (3^{m}7), a *flashing red* light. The light is unwatched.

Buoys.—Between North Channel dykes and North Channel, the passage is marked by two red, and two black spar buoys. On the southeast side of North Channel, opposite the upper entrance pier, are moored three black spar buoys and a boat type black light-buoy, showing a *fixed white* light, the latter being the most westerly of the four. A red light-buoy, showing a *quick-flashing red* light, is moored 450 feet (137^{m}2) from the outer end of the upper entrance pier.

Current.—Caution.—Near the lighthouse at the outer end of the pier, a strong current sets eastward of the course and must be carefully guarded against especially, with a tow of barges.

A bank extends three-quarters of a mile northeasterly from Chimney Island.

Chimney Point *(Lat. 44° 44′ N. Long. 75° 27″ W.)* is a prominent projection of the United States shore situated a third of a mile south of the upper entrance to North Channel. The 2 miles of shore between Galop Island and Chimney Point form a bight, into which a creek flows, half a mile southeast of Chimney Point. The numerous and prominent buildings of the "St. Lawrence State" hospital occupy this point.

Shoal.—Buoy.—From a point southwest half a mile from Chimney Point, a shoal with one to 9 feet (0^{m}3 to 2^{m}7) of water over it extends northward half a mile, its outer end being marked by a black light-buoy 161, bearing 223°, distant half mile from North Channel outer pier. The buoy shows a *flashing green* light.

Windmill Point, on the Canadian side, is situated 2½ miles southwest of Spencer Island, the shore between forming a slight bight, from which a shallow bank extends, in the northeastern part, half a mile. In the middle of this bight is a stream running into the river close west of **Johnstown Village.**

Charts 1444, 1457.

Lower Lakes Terminal *(Lat. 44° 44′ N., Long. 75° 28′ W.)*—In the bay east of Windmill Point, about 2 miles below Prescott, is located the Lower Lakes Terminal elevator. The elevator has a capacity of 5,500,000 bushels, and is a long narrow structure with unloading facilities for large lake boats on one side, and loading-out facilities to canal size boats on the other side. Carloading facilities are located at the inshore end where connections have been built with the Canadian Pacific and the Canadian National Railways. The railway yard has space for about 1,200 cars.

The berth for unloading lake boats is 1,340 feet (408^{m}4) long, 250 feet (76^{m}2) wide, and dredged to 24 feet (7^{m}3). It will accommodate two of the largest lake boats for rapid and simultaneous unloading by means of four travelling marine towers which can reach all holds of both vessels. Each tower has a capacity of 35,000 bushels per hour on the dip. This berth will also accommodate four other boats waiting to be unloaded.

The slip for loading river boats is 800 feet (243^{m}8) long, 200 feet (61^{m}0) wide, and dredged to 25 feet (7^{m}6) with berths for three boats to load and space for five boats waiting for loads.

In addition to the above, a berth has been provided for lightering canal boats, thus enabling them to load to full capacity at the upper lake ports, and by discharging part of their cargo at this point reduce their draught sufficiently to pass through the St. Lawrence River Canal locks. One berth, with a marine leg having a capacity of 2,500 bushels per hour, has been reserved for lightering and will be used for no other purpose.

Loading arrangements of cars consist of four elevator legs of 17,000 bushels capacity per hour loading to four tracks.

At the inshore end, cleaning facilities are provided and also a drier with boiler house for treating salvaged and out-of-condition grain.

Semaphore.—A semaphore has been established on the southwesterly extreme of the elevator wharf to control the movement of vessels entering the Galop Canal from the westward.

In the event of obstructions occurring in the canal, **stop warnings** will be indicated to eastbound vessels as follows:

At night.—Two *red* lights, one above the other, displayed from the mast of the semaphore, about 35 feet (10^{m}7) high.

In daytime.—The westerly end of the semaphore station will open to show a red daymark, spire shaped at top, 12 feet by 10 feet (3^{m}7 to 3^{m}0).

When the channel is all clear the station will show all white.

In thick weather.—When the semaphore is required during thick weather, a hand fog-horn will sound *one* blast *every 30 seconds.*

Mariners are warned to govern themselves accordingly when approaching the Galop Canal from the westward.

Light.—Near the shore of Windmill Point stands a white circular stone building, which, from a height of 92 feet (28^{m}0), exhibits a *fixed white* light.

Buoys.—Marking the edge of the bank, half a mile east of the above lighthouse, is moored a red conical buoy, 162 U. A black light-buoy, showing a *flashing white* light, is moored about 600 yards (548^{m}6) southeast of the Lower Lakes Terminal wharf to mark the north end of a shoal, with a least depth of 11 feet (3^{m}4) over it.

Charts 1444, 1457.

Prescott, with a population in 1951 of 3,518, is situated on the northwest side of the St. Lawrence River, opposite the city of Ogdensburg in New York State. It is a station of the Canadian National and the Canadian Pacific Railways. By the latter, Prescott is distant from Ottawa 52 miles, and by the Canadian National Railways, it is distant from Montreal and Kingston 114 and 62 miles, respectively. A car ferry connecting the Canadian Pacific with the United States Railways, and a passenger ferry, both operating throughout the year, cross the river to Ogdensburg.

Wharves.—There are about a dozen of these with depths alongside the principal ones ranging from 12 to 21 feet (3m7 to 6m4). Near the western end of the waterfront is the wharf of the Department of Transport and yard for the storage and refitting of buoys, entitled the Dominion lighthouse depot. Next below this wharf is the Government pier 210 feet (64m0) long, parallel to the stream; in the berth, 150 feet (45m7) in length, at the lower end is a depth of 11½ to 12½ feet (3m5 to 3m8). Near the eastern end of the waterfront is the Canadian Pacific Railway car ferry slip, with 19 feet (5m8) of water. Immediately east of the Canadian Pacific Railway wharf is the dock of the Canada Steamship Lines, with 16 feet (4m9) of water alongside.

Lights.—Prescott beacon *fixed red* light is shown from a pole erected on the outer end of the Dominion lighthouse depot wharf, at a height of 25 feet (7m6).

A light or lights of different characters, characteristics and colour, may be shown from time to time from the lighthouse on the top of the lighthouse depot at Prescott. These lights will be irregular and intermittent and for experimental purposes only.

The shore between Windmill Point lighthouse and Prescott Canada Steamship Lines wharf, one mile distant, forms a slight bight fronted by a bank extending off 300 yards (274m3).

United States chart 13. Charts 1444, 1457.

Ogdensburg, in the State of New York, is opposite Prescott. It has a large shipping trade in grain, and extensive manufactures. It is on the New York Central and Hudson River Railway, and is connected by car ferry and passengers ferry with Prescott. The city is built on both sides of **Oswegatchie River.** Half a mile above Ogdensburg lighthouse is the marine railway of the St. Lawrence Marine Repair Dock Corp. 736½ feet (224m4) long, over all length of cradle 300 feet (91m4), width 52 feet (15m8) and depth 16 feet (4m9).

Channels of approach.—Fronting Ogdensburg is a bank, with as little as one foot (0m3) of water over it, extending half-way across the St. Lawrence River and through this bank two channels have been dredged, but these, on account of the shifting character of the bank require constant examination.

The westerly or upper entrance channel with a depth of 17 feet (5m2) is 3,000 feet (914m4) long, extending from deep water in the St. Lawrance River to the highway bridge across the Oswegatchie River; the outer 1,700 feet (518m2) is 900 feet (274m3) wide, while the upper 600 feet (182m9) narrows to 125 feet (38m1) just below the bridge.

The lower entrance, nearly a mile below the upper or Oswegatchie Channel, consists of a combined channel and basin with a limiting depth of 17 feet (5m2) about 3,500 feet (1066m8) across, at the entrance from the St. Lawrence River

United States chart 13. Charts 1444, 1457.

and extending into the elevator and freight wharves of the Rutland Railroad terminus, a distance varying from 1,600 to 2,100 feet (487^{m}7 to 640^{m}2).

The city-front channel, extending between the upper and lower entrances, is close along the wharves and is from 300 to 400 feet (91^{m}4 to 121^{m}9) wide with 17 feet (5^{m}2) of water.

Lights.—On the low, southwest entrance point of Oswegatchie River is erected a grey and cream-coloured stone tower, which, at a height of 64 feet (19^{m}5), exhibits an *occulting white* light. The outer end of the New York Central car ferry pier, on the westerly side of the upper entrance channel, about 800 feet (243^{m}8) north of Ogdensburg light, is marked by a *fixed red* light, 33 feet (10^{m}1) high.

Light and other buoys.—A red conical buoy No. 2, showing a *flashing red* light, is moored on the western side of the entrance of the upper or west channel approach to Ogdensburg, 480 yards (438^{m}9), 337°, from the main lighthouse. On the eastern side of the channel, northeastward and 355 yards (324^{m}6) from No. 2 is moored a black can buoy. Abreast the main lighthouse, the dredged channel is marked by a red and a black buoy. A black buoy, showing a *flashing white* light, is placed at the junction of the upper channel with the city-front channel *(Lat. 44° 42′ N., Long. 75° 30′ W.)*. A black buoy, No. 1, showing a *flashing white* light, marking the eastern side of the lower entrance, is moored 3,500 feet (1,066^{m}8) northeastward of the outer end of the Rutland Railway wharf. A red light-buoy, showing a *flashing red* light, marking the eastern end of the shoal fronting Ogdensburg, is moored 500 feet (152^{m}4) northward of the same point. A red conical buoy marks the north side of the city-front terminal.

Directions for Ogdensburg.—Vessels from the southwest approach Ogdensburg by the western channel, passing between the buoys, black on the port and red on the starboard hand, keeping near the latter on account of the current, the rate of which is 1¼ knots.

Vessels from the northeast use the channel leading along the outer ends of the city wharves. In both channels the depth is 17 feet (5^{m}2). (*See* above.)

Charts 1444, 1455, 1456, 1457.

Directions, Cornwall to Prescott.—(For directions Soulanges Canal to Cornwall, *see* page 110). Masters using this portion of the river should employ a pilot until well acquainted with local conditions. From Cornwall a vessel will take the Cornwall Canal (for regulations and signals *see* page xliii), and, at Mille Roches Village, will emerge into the deep water 3 miles long, northwest of Sheek Island, known by some as Bergins Lake. The southeast side of this water is marked by four *amber* and one *white* electric lights. One *white* and two *amber* electric lights are shown from the old canal wall on the opposite side of the lake. On arriving at Dickinson Landing, distant 11 miles from the lower entrance of the canal, a vessel will pass north of Wagner Island and south of the red light-buoys 6 U and 8 U, marking Delaney and Archibald Shoals, and if taking the Canadian channel north of Croil Island, will keep the mainland aboard to avoid the extensive shallow bank from the east point of Croil Island, passing northward of the black light-buoy moored on Maxwell Shoal.

When three-quarters of a mile below the entrance to Farran Point Canal, a vessel will pass south of Graveyard Point light and a red spar buoy, 38. The current north of Croil Island has a rate of about 3 knots. As the entrance to the canal is approached, the eddy near it must be guarded against (*see* Caution,

Charts 1444, 1455, 1456, 1457.

page 117). The shallow-draught swift steamers ascend Farran Point Rapids. If not wishing to take the canal or the rapids, a vessel, after passing Archibald Shoal red light-buoy, 8 U, may pass through Big Sny and south of Croil Island to enter the main channel again between Croil and Cat Islands. This route is half a mile longer in distance, but shorter in time for a vessel with barges in tow.

The track is now south of red light-buoy No. 44 U; thence north of the black spar 45 U marking Sturgeon Shoal.

As Weaver Point, East Williamsburg, *(Lat. 44° 56′ N., Long. 75° 04′ W.)* is approached, the same side may be kept close aboard, to take advantage of the slack water below this point, the current here having a rate of from 4 to 5 knots. Extreme caution and local knowledge is required for this manœuvre. Pass southward of red light-buoy, 50 U, off Weaver Point, red spar buoy, 52 U, red light-buoy, 54 U, and the red spar buoy abreast the lower end of Crysler Island. Vessels drawing less than 9 feet (2m7) can pass south of Crysler and Strawberry Islands and east of black light-buoy 67 U.

North of this buoy, the tracks again join, and a vessel may keep in mid-channel north of the latter island and the black light-buoy 69 U, near the north-west point. Keeping in the middle of the channel, a vessel will haul southward passing south of red light-buoy 72 U, marking Jackass Shoal (*see* page 118). Vessels of not over 9 feet (2m7) draught may pass northward of this shoal. A vessel will pass southeast of the red spar buoy 780 feet (237m8) above Jackass Shoal, keeping midway between Doran Island and the Canadian shore, pass south of light-buoy 82 U, and red spar buoy 84 U, half a mile below Morrisburg, and, so into Rapide Plat or Morrisburg Canal (*see* regulations, page xxxvi). Swift, shallow-draught steamers ascend Rapide Plat.

After leaving this canal, the length of which is $2\frac{2}{3}$ miles, keep nearer the Canadian shore for $2\frac{1}{4}$ miles, until above Pinetree Point, where the measured rate of the current is 5 knots, passing Robertson Point light, and Pinetree Point light on the starboard hand. Thence keep rather near the United States shore until half a mile below Iroquois Village, when the entrance to Galop Canal may be steered for. (For anchorage, *see* page 121).

If taking Galop Canal, as all but the fastest passenger steamers do, *see* canal regulations, page xxxvi.

Vessels of sufficient speed to overcome the Iroquois Point and Cardinal Rapids (the estimated rate of the current in the rapids being 8 knots) pass midway between Point Rockway and Iroquois Point, hauling westward round the latter, and passing south of Toussaint Island red light-buoy. Thence, keep rather nearer Sparrowhawk Point than the west side of Toussaint Island, and after rounding the former, which is steep-to, the red conical buoy on Frazer Shoal may be kept a little on the starboard bow. Pass south of it, and, thence, midway between the canal embankment and the islands off the south shore, Dixon Island black can buoy, 127 U, half a mile below the canal entrance lock is passed northward of, and the canal entered by the lift lock at the foot of Galop Rapids. Vessels drawing 9 feet (2m7) may enter Cardinal Harbour, the entrance to which is two-thirds of a mile above Frazer Shoal conical buoy.

On emerging from Galop Canal, a vessel has to pass south of red light-buoy 138 U, two red spar buoys east of it, one red spar west of it, red light-buoy 142 U, and northwest of two black light-buoys, Nos. 141 U and 143 U, and two black spar buoys moored between them and the canal. The red buoys should be given a good berth as the water is shoal immediately north of them. Pass between the two short dykes, the northwestern one being lighted, northwest of

Charts 1444, 1455, 1456, 1457.

two black spar buoys, southeast of two red spar buoys and so to North Channel, which has two lights near its southwest end, and two on the pier extending from Spencer Point. On leaving North Channel, between Spencer and Drummond Islands, a vessel will pass northwest of three black spar buoys and a black light-buoy on the edge of the Chimney Island Bank. From the end of the pier from Spencer Island, steer 235° for Windmill Point light for half a mile, to pass north of the black light-buoy 161 U, marking the dangerous bank extending from Chimney Point. If required, a vessel may now haul in to the wharves at the Lower Lakes Terminal.

Caution.—On emerging from North Channel, a vessel will find a strong current on her starboard bow, which must be guarded against, especially with a tow of barges.

Thence, keep Windmill Point light a little on the starboard bow, passing north of the black light-buoy on the 11-foot (3^m4) shoal, abreast the Lower Lakes Terminal wharf, and a quarter of a mile south of a red concial buoy, 162 U, lying east of the light and marking the edge of the shorebank. Keep nearer the Canadian shore until Prescott is reached, when a vessel may berth at the wharves or continue upstream as directed on page 140.

If stopping at Ogdensburg, a vessel when abreast Windmill Point may haul over for the Rutland Railway wharf at Ogdensburg, and keep along outside the wharves in the channel with a depth of 17 feet (5^m2), or may berth at the railway wharf. (For the western channel to Ogdensburg, *see* page 126).

Prescott to Cornwall.—Unless locally acquainted, a master of a vessel should not attempt the river without a pilot. From Prescott, a vessel will keep rather nearer the Canadian shore, passing a quarter of a mile from Windmill Point light and the same distance south of red conical buoy 162 U. Mariners are warned to govern themselves, regarding entering Galop Canal, according to the signals shown by the semaphore (page 124) on the pier at the Lower Lakes Terminal. From this position North Channel pier light may be steered for, taking care to pass north of the black light-buoy on the 11-foot (3^m4) shoal, abreast the Lower Lakes Terminal wharf, and black light-buoy 161 U marking the dangerous bank from Chimney Point. Enter, now, North Channel, with the long pier on the port hand, and a black light-buoy, and three black spar buoys on the starboard hand. (*See* Caution, page 123).

On emerging from North Channel cut, the light at North Channel dykes will be seen a little on the port bow. Pass southeast of two red spar buoys, and northwest of two black spar buoys, marking the edges of the channel between North Channel and North Channel dykes. Pass between the two short dykes and steer for red light-buoy, 142 U, passing a black light-buoy to starboard; now head a little south of red light-buoy 138 U, passing north of two black spar buoys and south of one red spar. Thence pass south of a red spar buoy and into Galop Canal, leaving a red spar on the port hand at the entrance.

Light draught vessels running Galop Rapids will pass south of the light and canal, and north of Adams and Galop Islands, joining the main channel a little below the lift lock No. 28.

After a mile in the canal, a vessel will be at the lift lock No. 28 at the foot of Galop Rapids, and will leave the canal for the natural channel, passing north of Dixon Island black can buoy 127, and in mid-channel through Cardinal Rapids, until down to the red light-buoy marking the southeastern extremity of Frazer Shoal. Pass southeast of this buoy, and keep rather nearer the United States shore, rounding Sparrowhawk Point and in mid-channel south of Toussaint Island, until abreast, and south of, its red light-buoy.

Charts 1444, 1455, 1456, 1457.

A vessel will keep in mid-channel through Iroquois Rapids, joining the common track for all vessels, north of Point Rockway abreast the lower entrance to Galop Canal. Until nearly down to Pinetree Point, keep rather nearer the United States shore, and thence, in mid-channel to abreast the entrance to Rapide Plat Canal, passing Pinetree Point and Robertson Point lights on the port hand. The current between Waddell Point and Pinetree Point has a measured rate of five knots. (For anchorage, *see* page 121).

A vessel now continues by the natural channel, through the rapids, by keeping the canal embankment close aboard (*see* page 120), passing north of Canada Island, and joining the common track, a quarter of a mile below Morrisburg. A vessel will now pass south of the red spar buoy and red light-buoy, 82 U, lying half a mile below Morrisburg. Thence proceed north of Doran Island, (*Lat. 44° 54′ N., Long. 75° 09′ W.*), and southeast of two red buoys, one a light-buoy, 72 U and the other, a spar $1\frac{1}{3}$ cables above Jackass Shoal (*see* page 118). A vessel drawing less than 9 feet (2^m7) can pass north of Jackass Shoal. When below this danger, keep in mid-channel, passing north of black light-buoy 69 U, off the northwest part of Goose Neck Island, and also north of Strawberry and Crysler Islands.

Vessels not drawing over 9 feet (2^m7) of water may pass between Goose Neck and Strawberry Islands, by leaving the black light-buoy 67 U, off the northeast point of the former, on the starboard hand. Thence, passing south of Strawberry and Crysler Islands, and east of the black can buoy marking the end of the shoal off Crysler Island, joining the main channel off Bradford Point. A vessel passing north of Crysler Island will pass south of a red spar buoy, a red light-buoy, 54 U, marking the edge of the dangerous Prunner Shoal, a red spar buoy off Cook Point, and the red light-buoy, 50 U, off Weaver Point.

From Weaver Point, keeping rather nearer the Canadian shore to avoid Sturgeon Shoal, marked by a black spar buoy, pass southeast of Steen Island red light-buoy, 44 U, and northward of Cat Island black spar buoy. The current between Crysler Island and this point has an estimated rate of 3 knots. Vessels, now, take the Farran Point Rapids between the canal embankment and the northwest coast of Croil Island, passing southeast of red light-buoy, 40 U, at their upper end. (*See* Caution, page 117).

There is a deep passage also south and east of Croil Island, for which *see* page 114. From abreast the lower entrance to the canal, keep in the middle of the channel north of Croil Island, passing Graveyard Point light and red spar buoy, 38 U, on the port hand, and, taking care, as Archibald Shoal red light-buoy, 8 U is approached, to keep north of the large bank extending half a mile from the northeast extremity of Croil Island, and northward of the black light-buoy 11 U, moored on the edge of Maxwell Shoal, 600 yards (548^m 6) northeast of Croil Island. Pass south of light-buoys 8 U and 6 U, marking Archibald and Delaney Shoals, and enter Cornwall Canal at Dickinson Landing. For Bergins Lake, *see* page 114. For directions, Cornwall to Soulanges Canal, *see* page 111.

Current.—The current north of Croil Island has an estimated rate of 3 knots.

Chart 1455.

Light draught passenger vessels run the Long Sault Rapids, passing south of Sheek and Barnhart Islands, northward of the dangerous Crab Shoal, unbuoyed, northward of Cornwall Island, and joining the main channel again at the lower entrance to Cornwall Canal. (*See* page 109).

Chart 1455.

Ship Channel.—Extensive improvements, carried out by the Governments of Canada and the United States, between Prescott and the head of the river, have provided a good channel for large vessels. Shoals were removed to a depth of 25½ feet (7m7) to widen and straighten the courses in this section of the river. Details are given in the following pages.

Chart 1457.

Little Church Bay.—The Canadian shore of the St. Lawrence River, from Prescott, trends southwesterly 2½ miles to the pier on the northeast entrance point to Little Church Bay. From the upper portion of this bight, a bank with less than 12 feet (3m7) on it extends 400 yards (365m8).

Maitland, a small village with wharf, and a station on the Canadian National Railways, stands on the shore, nearly 7 miles southwestward of Prescott. With the exception of a small bay, one mile northeast of Maitland, the shore between it and Little Church Bay is fairly straight, as is, also, the edge of the shorebank. About 2¼ miles northeastward of Maitland, and about 250 feet (76m2) offshore, is a white spar buoy, marking the outer end of a water intake pipe.

Light-buoy.—A black and white light-buoy, showing a *short-long flashing white light,* is moored 2,600 feet (792m5), 138°, from the Old Distillery at Maitland.

Morristown Point, on the United States side is 9½ miles southwestward of Ogdensburg, the shore between running nearly straight, with the offshore bank, nowhere extending more than 300 yards (274m3), and, usually, not more than 150 yards (137m2) from the shore. There is a pier on Morristown Point, and the land is occupied by Edgewater and Terrace Parks. The slight indentation half a mile east of Morristown Point is known as **Perch Bay** *(Lat. 44° 36′ N. Long. 75° 38′ W.).* The New York Central and Hudson River Railway runs close to the shore between the point and Ogdensburg.

A spot with 5 feet (1m5) over it, lies, on the edge of the shorebank, 600 feet (182m9) north of Morristown Point.

Catamaran Shoal, an isolated patch with 12 feet (3m7) over it, lies 1¼ miles northeastward of Morristown Point; it is marked on its north side by a black can buoy .

Aspect.—The shores of the deep and broad portion of the St. Lawrence River between Prescott and Brockville are park-like, the partly settled land half a mile back rising to a height of 50 to 80 feet (15m2 to 24m4), the United States side being slightly higher.

Morristown, in the State of New York, is situated close northeast of a narrow indentation named **Morristown Bay,** and a mile southwest from Morristown Point. It is a station of the New York Central and Hudson River Railway, the wharf of which, at the mouth of Morristown Bay, has a depth of 6 feet (1m8). The land, a little above the town, rises to a height of 120 feet (36m6).

Ferry.—A ferry plies between Morristown and Brockville from April to December.

Charts 1443, 1457.

Brockville, Ontario, is situated on the north shore of the river, the Canadian Pacific Railway wharf being distant 11½ miles southwestward of Prescott lighthouse. The 4½ miles of shore between Maitland and Brockville is fairly straight, the bank nowhere extending off more than 200 yards (182m9). Brockville had, in 1951, a population of 12,301. It is a station of the Canadian National and Canadian Pacific Railways, being distant from Ottawa by the latter 78 miles. From Montreal and Kingston, it is distant, respectively, 125½ and 49¾ miles. The Ontario Hospital buildings, with a spire, three-quarters of a mile northeast of Brockville, stand on land 140 feet (42m7) high, and are conspicuous. Brockville is on the main St. Lawrence motor highway, and from this point a principal highway leads to Smiths Falls.

The total frontage of the wharves is about 2,000 feet (609m6) with depths of from 6 to 18½ feet (1m8 to 5m6). At the upstream end of the harbour are the ruins of the upper Canadian Pacific Railway wharf. Next is the dock of the Central Canada Coal Co., with a frontage of 120 feet (36m6) and depth of 17 feet (5m2) alongside (1943). Immediately below this dock are the docks of the Canada Foundry and Forgings, Ltd., and R. H. Smart, with a frontage of approximately 425 feet (129m5) and depths of 13 to 17 feet (4m5 to 5m2) alongside. The Canadian Pacific Railway dock, used by the Canada Steamship Lines, lies on the east side of Blockhouse Island (*Lat. 44° 35′ N., Long. 75° 41′ W.*) (now joined to the mainland). In 1943, the berth at this wharf, 450 feet (137m2) in length, had a depth of 18 feet (5m5). The Government wharf, extending west from Blockhouse Island, is 467 feet (142m3) long, with a depth of 14 to 18 feet (4m3 to 5m5) alongside. Below the Canadian Pacific Railway dock are the wharves of the W. B. Reynolds Coal Co., Ltd., the Laing Produce and Storage Co., and J. R. Bresnan and Co. The dock of the W. B. Reynolds Coal Co., Ltd., is 245 feet (74m7) long with a depth of 18 feet (5m5) of water, that of the Laing Produce and Storage Co., Ltd., is 300 feet (91m4) long with about 9 feet (2m7) of water and that of J. R. Bresnan and Co. is approximately 375 feet (114m3) long with from 14 to 24 feet (4m3 to 7m3) alongside.

Buoys.—Two red spar buoys mark the edge of the shorebank, near the south end of the wharf, on Blockhouse Island.

A red buoy moored near the outer end of the upper Canadian Pacific Railway wharf marks a shoal spot off this wharf. A white spar buoy is moored about 500 feet (152m4) west of Victoria Island, just above Brockville.

Ferries ply between Brockville and Morristown, New York. A channel, 8 feet (2m4) deep, has been dredged to the Brockville-Morristown Transportation Company's terminal at the foot of Home Street.

Light.—A *flashing red* light is exhibited, at a height of 8 feet (2m4), from the upper end of Blockhouse Island.

McNair Islands, three in number, lie in the middle of the river, three-quarters of a mile below the Canadian Pacific Railway wharf. The northwestern and largest McNair Island is about 15 feet (4m6) high, and on its north point, are still standing the buttresses of a proposed bridge across the river. The smaller two islands are bushy, and about 10 feet (3m0) high. The Canadian shore abreast these islands is 20 feet (6m1) high and cliffy.

McNair Island light.—On the old bridge pier on the north extreme of McNair Island, a white steel superstructure, at a height of 30 feet (9m1), shows a *flashing white* light. This light is unwatched.

Charts 1443, 1457.

North McNair Shoal, a rock with 13 feet (4m0) of water on it, lies 270 yards (246m8) northwest of the largest McNair Island, and has a passage on either side, although the usual track is southeast of the buoy.

Light-buoy.—A red light-buoy, 2 T, showing a *flashing red* light, is moored in 31 feet (9m4) of water on the south side of North McNair Shoal, 675 feet (205m8) northward of McNair Island light.

Point Comfort.—From **Chapman Point** of Morristown Bay, the New York shore runs southwesterly to **Holmes, De Lack,** and **Comfort Points,** distant, therefrom 1½, 2½, and 3½ miles, respectively. The indentation, a third of a mile northeast of Holmes Point, is named **Eager Bay,** a third of a mile northwest of which is **Old Man Island.** Northward 400 yards (365m8) from this island is the north side of an extensive patch of rocks, some of which are above water, collectively known as **Brockville Rock.**

Between Holmes and De Lack Points, the shore is almost joined to the northeastern end of Brock Group of islands by extensive banks having as little as 6 feet (1m8) of water over them. The water between Brock Group and the United States shore is full of shoal patches. This portion of the southeast shore is from 40 to 80 feet (12m2 to 24m4) in height.

Oak Point, on the same side, is situated 3½ miles southwesterly from Point Comfort, the shore between, 80 feet (24m4) high, being straight excepting for a small bay about midway between these points. The southwest point of this bay is named **Birch Point** *(Lat. 44° 32′ N. Long. 75° 44′ W.).* Landing can be had at Oak Point wharf, by boats drawing less than 6 feet (1m8).

Oak Point Shoal, with 13 feet (4m0) of water over it, lies 5 cables southwest of Cole Shoal old light-tower and 3 cables off the United States shore.

Lily Bay.—From Brockville, the northwest shore of the river runs, irregularly, over 3 miles to the northeast side of Lily Bay, and midway between, a stream discharges close northeast of **St. Lawrence Park.** South of the latter, and 1½ miles from Lily Bay, is a projection of the mainland known as **McDonald Point,** 100 yards (91m4) east of which is **McDonald Point Shoal,** with 5 feet (1m5) of water on it.

The channel between this portion of the shore and Brock Group of islands is named Brockville Narrows, 150 to 300 yards (137m2 to 274m3) wide, and through which the rate of the current is from 2¾ to 3½ knots.

Thousand Islands.—The stretch of river, between Brockville on the northeast and Cape Vincent on the southwest, is thickly strewn with islands, large and small, with deep water channels between, known as the Thousand Islands.

Brock Group is the name given to a cluster of islands under various names, occupying the middle of the river between Brockville and Lily Bay. The northeastern of the group south of Brockville Narrows is called **Conran Island,** and is in Canadian waters. That, at the upper end, southeast of the International Boundary, is known from this circumstance as **American Island.**

Brockville Narrows is the ship channel, 2¾ miles long, stretching from a short distance above Brockville to Lily Bay, separating Brock Group from the main shore. This section is the narrowest part of the Canadian portion of the improved ship channel and varies in width from 500 to 600 feet (152m4 to 182m9). It is practically straight, and the north edge of the channel runs close up to Skelton, Royal and Needles Eye Islands lights.

Charts 1443, 1457.

Skelton Island is the largest of a group of four islands, lying 350 yards (320^{m}0) from the Canadian shore, three-quarters of a mile above the Government wharf, Brockville.

Lights.—Skelton Island.—A lantern on a red, square steel skelton tower on the southeast end of Skelton Island exhibits, at a height of 31 feet (9^{m}4), a *flashing red* light. This light is unwatched.

Royal Island.—A *flashing red* light is exhibited, at a height of 25 feet (7^{m}6), from a red steel structure on a small shoal close southwestward of Royal Island.

Needles Eye Island.—On the southeast point of the island, a *flashing red* light is shown, at an elevation of 20 feet (6^{m}1), from a lantern on a red skeleton tower. The light is unwatched.

At **Fernbank,** inside Needles Eye Island, is a shoal with 3½ to 5 feet (1^{m}0 to 1^{m}5) of water over it, and marked by a pier built just outside the shoal.

McCoy Island lies next west of Conran Island *(Lat. 44° 34′ N., Long. 75° 42′ W.)* and the south edge of the ship channel passes close up to the former, the shoal formerly extending off the island having been removed.

Light-buoys.—On the north side of the eastern extremity of the shoal, making off northeasterly from Conran Island, and south of Skelton Island light is moored black light-buoy, 3 T, showing a *flashing white* light.

On the north edge of McCoy Shoal, a cable south of Royal Island light, is moored black light-buoy, 5 T, showing a *flashing white* light.

Coronation Shoal with 4 feet (1^{m}2) of water on it lies north of the channel 3¼ cables above Royal Island light. On the south side of this shoal, 3 cables southwest of Royal Island light is moored red light-buoy 6 T, showing a *flashing red* light.

Cockburn Island lies a third of a mile above McCoy Island, and the edge of the dredged channel passes about 75 feet (22^{m}9) off the island.

Sparrow Island lies on the south side of the channel abreast Needles Eye Island, the edge of the channel being close up to this island, and also to **Stovin Island,** lying immediately northeast of Sparrow Island.

De Wattville leading lights.—The front light is shown from a white square wooden structure on De Wattville Island, at a height of 30 feet (9^{m}1). The rear light, on the mainland, 2 cables 037½° from the front light, is shown from a red, steel, skeleton tower at a height of 70 feet (21^{m}3). The lights are *fixed white.* The rear light-structure is not visible in line of range; only a part of the watch-room and lantern being seen over the tops of the trees.

Whitney Point.—From the head of Lily Bay, the Canadian shore runs in the same general direction, 2¾ miles to a broad point at **Butternut Bay,** 80 feet (24^{m}4) high, on which is situated **Union Park,** having a small landing wharf. Thence, the shore keeps the same direction 2 miles farther to Whitney Point, the bight in the last stretch being flanked by a chain of islets lying in front of **Jones Creek,** the mouth of which is three-quarters of a mile northeast of Whitney Point. The land a little inside this point rises to a height of 80 feet (24^{m}4).

A mile above Whitney Point is **Patterson Bay.** Whitney Point (sometimes known locally as **Sifton Point**) has a large residence and prominent water tower showing above the trees.

Charts 1443, 1457.

Light-buoys.—An isolated spot, with 15 feet (4m6) of water on it, lies close south of the channel, 3½ cables above De Wattville front light. This shoal is marked by black light-buoy 9 T, showing a *flashing white* light.

Shoal patches, in the middle of the river, extend nearly a mile southwest of Brock Group. A black spar buoy, fitted with a radar reflector, is moored on the west side of the upper spot, known as **Cole Ferry Shoal,** one mile southwestward of De Wattville front light.

A red light-buoy 12 T, showing a *flashing red* light, is moored about 2 cables southward of **Cole Shoal,** which is situated 1½ miles above De Wattville Island. Several isolated shoal patches, with depths of from 3 to 6 feet (0m9 to 1m8) over them, are situated within 4 cables southwestward of Cole Shoal. On the south side of the channel, a black light-buoy 13 T, showing a *flashing white* light, marks a shoal, with a depth of 6 feet (1m8) over it, located about 5 cables southward of Cole Shoal.

Chart 1457.

Union Park Shoal, situated close eastward of Union Park wharf, has a least depth of 5 feet (1m5) over it. Two shoal patches, with depths of 2 and 6 feet (0m6 and 1m8) over them are situated close within 1½ cables eastward of Savage Island, which lies about 8½ cables south-southwestward of Union Park.

Eliot Shoal.—Three-quarters of a mile above Whitney Point is **Eliot Point** on the northeast side of **Patterson Bay,** and 2 cables southeastward from Eliot Point lies the shoal of that name, with one foot (0m3) of water over it.

Bridge Island *(Lat. 44° 28′ N. Long. 75° 50′ W.)* is a small island about 1½ cables from the mainland and about 2 miles southwestward of Whitney Point.

Light.—A white, square, skeleton tower, erected on a rock, 500 feet (152m4) southward of Bridge Island, exhibits at a height of 18 feet (5m5), a *flashing red* light. This is to guide vessels toward the Canadian channel. The light is unwatched.

Buoys.—A red spar buoy is moored on the west edge of the channel, about 530 yards (484m6) eastward of Bridge Island light; abreast this buoy is a black spar buoy on the east side of the channel; northeastward of this black spar buoy are two other black spars, marking two rocks, with less than 6 feet (1m8) over them, and about midway between the spar buoys is a spot with only one foot (0m3) over it.

Chippewa Point *(Lat. 44° 28′ N. Long. 75° 47′ W.)*, on the United States shore, is situated with its southwest extreme 4 miles southwestward from Oak Point. The shore for half a mile below, and one mile above the latter, is fronted by a shallow bank containing several islets, the upper one of which is **Whaleback Island.** Distant 1·8 and 1·4 miles, respectively, northeast of Chippewa Point, are situated two small dilapidated wharves known as **Forrester** and **Allen** docks. Two patches, with 16 and 13 feet (4m9 and 0m9) of water on them, are situated one cable northwestward and 2 cables northward, respectively, of Forrester dock.

Southwest 300 yards (274m3) from Allen dock is a boat harbour called Blind Bay, the entrance to which can be seen on the darkest night, and serves

Chart 1457.

as a useful turning mark. Between Forrester dock and Chippewa Point, the water is fairly deep. The land close to this shore rises to a height of 80 feet (24m4).

Shoal water extends 2 cables southwest from Chippewa Point.

Cross Over Island.—This small island, in United States waters, about 10 feet (3m0) high, with houses and an abandoned light-tower on it, lies more than half a mile from the southeast shore, and $1\frac{3}{4}$ miles southwestward of Oak Point.

From Cross Over Island, shoal water extends south, and southeast, 150 yards (137m2). The small islet, 300 yards (274m3) southwestward of Cross Over Island, is bare and about 5 feet (1m5) high.

Light.—On Bay State Shoal, half a mile west of Whaleback Island, is erected a red square skeleton tower on a white tank house on a concrete base, that, from a height of 38 feet (11m6), exhibits a *flashing white* light.

Buoyage.—To the westward of a shoal with 11 feet (3m4)) over it and 3 cables 055° from Bay State Shoal light is moored a black light-buoy, 5, showing a *flashing green* light. On the east end of Bay State Shoal, 700 feet (213m4) from the lighthouse, is moored a red conical buoy, 2. Northwest of a shoal, with 4 feet (1m2) over it, lying $1\frac{1}{2}$ cables west of Whaleback Island, is moored a black can buoy, 7. On the southwest extreme of the shoal making off from Whaleback Island is moored a black light-buoy, 9, showing a *flashing white* light. Red light-buoy, 4, showing a *flashing red* light, is moored opposite light-buoy 9, and 600 feet (182m9), 099°, from the tower on Cross Over Island.

Blind Bay Shoal light-buoy.—On the south side of the shoal, marking the turn opposite Blind Bay, is moored a red light-buoy, 4 A, showing a *flashing red* light. The south edge of the shoal is also marked by a red conical buoy, No. 6.

Superior Shoal, 2 cables long northeast and southwest, with one foot (0m3) of water on it, lies one cable westward of the upper extreme of Chippewa Point, being separated therefrom by a narrow channel.

Light.—On the north end of Superior Shoal is erected a black, pyramidal skeleton tower on a white tank house that, at a height of 28 feet (8m5), exhibits a *flashing white* light. This light is unwatched.

Rockport.—From Whitney Point (*see* page 133), the Canadian shore runs in a general southwest direction, 10 miles, to Rockport *(Lat. 44° 23′ N., Long. 75° 56′ W.)*, at the northeast entrance to Raft Narrows (Canadian Middle Channel, *see* page 142). The village is snugly sheltered from the southwest, and is consequently not seen from that direction. Its small yellow-coloured church has a white band round its steeple. The nearest railway station is **Lansdowne** on the Canadian National Railways, distant about $2\frac{3}{4}$ miles.

Wharves.—At Rockport is a Government wharf with a face 60 feet (18m3) in length; along the face is a depth of $13\frac{1}{2}$ feet (4m1). Lansdowne Government wharf has a face 42 feet (12m8) in length, with a depth of 6 feet (1m8) along the face. In a small bay to the eastward of the Government wharf is a privately operated marine railway and boat-building yard.

Ferry.—A ferry plies between Rockport and Alexandria Bay.

Rockport and the adjacent shores and the islands are much frequented in summertime as pleasure resorts.

Chart 1457.

On this portion of the Canadian shore are the villages of **Mallorytown** and **Pooles Resort,** distant, respectively, $3\frac{3}{4}$ and 6 miles southwest of Whitney Point. A short distance below Pooles Resort is **Larue Mills,** at the mouth of Larue Creek. Communication is made with the main highway by road 2 miles back.

A rock, just above the water, lies 065°, distant three-quarters of a mile from Mallorytown pier, 4 cables west of Ice Island.

Vessels approaching Pooles Resort landing pier must take care to avoid shallow water lying 500 feet (152m4) southeast of the pier.

Grenadier Island is $4\frac{3}{4}$ miles long northeast and southwest, the upper extremity being $1\frac{1}{2}$ miles below Rockport. Between this end of the island and the Canadian shore lies **Tar Island.** A shallow flat having on it several islets, the northernmost of which are **Ice** and **Broughton Islands,** extends 2 miles northeast of the lower part of Grenadier Island, the whole being separated from the main shore by a narrow channel, with 12 feet (3m7) least water, the more difficult part being abreast the lower end of Tar Island.

Lights.—On the southwest extremity of Grenadier Island is erected a steel tank, from which, at a height of 25 feet (7m6), is exhibited a *flashing white* light.

A white square steel skeleton tower, erected on **Duck Rock,** close westward of **Duck Island,** exhibits, at a height of 22 feet (6m7), a *flashing green* light. This is for the guidance of vessels using the Canadian channel.

Buoys.—The channel between Grenadier Island and the Canadian main shore is marked by the following buoys: —

(1) A black steel float, showing a *flashing green* light, on the edge of the bank, 4 cables westward of Ice Island.

(1A) A red spar buoy, about $1\frac{1}{2}$ cables northward, and a red spar buoy, about 2 cables northeastward, respectively, of (1).

(2) A black and red horizontally-striped spar buoy, marking an 8-foot (2m4) middleground, opposite Channel Island.

(3) A black spar on the southeast side of the channel, marking a very shoal spot abreast of (2).

(4) A black light-buoy, 9 C, showing a *flashing green* light on the southeast side of channel, opposite Pooles Resort, marking the bend in the channel.

(5) A red spar on the edge of the bank, 170 yards (155m4) northeastward of Goose Island.

(6) A black spar on the northern edge of a shoal patch, 700 yards (612m6) southwest of Duck Rock light.

(7) A red spar opposite (6) on northwest side of channel.

Indian Chief Islands.—Occupying the middle of the river, between Whitney and Chippewa Points, is a group of small islands under various names, the two, farthest south and nearest Chippewa Point, being named Indian Chief Islands *(Lat. 44° 28′ N., Long. 75° 48′ W.)*, the ship channel passing between them and Chippewa Point. From the northern islands of the group, the central and highest of which is about 30 feet (9m1) high, only one being occupied, shoal water extends to Crossover Island.

Chart 1457.

Between Indian Chief Islands and Grenadier Island are several other small islands, the most outlying being Dark and **Griswold Islands.**

Between Grenadier and Indian Chief Islands are many unbuoyed rocky patches, but, as the ship channel passes southeastward of them all, only those bordering the channel will be alluded to.

Dark Island, steep-to on its southeast side, about 40 feet (12^{m}2) high, and crowned with a handsome and imposing summer residence with red-tiled roof, lies one mile southwesterly from Chippewa Point.

Dark Island Channel.—An unbuoyed channel with deep water, narrow between isolated shoals, leads from the deep water off Whitney Point on the Canadian shore, southward toward Dark Island and past its western end into the main channel near Haskell Shoal. It is much used by local craft.

Dark Island Shoal, with one foot (0^{m}3) of water over it, is situated one-half mile north of the northeast end of Dark Island. East, 430 yards (392^{m}2) from this shoal, is a patch with 8 feet (2^{m}4) of water on it.

A red, conical buoy, No. 8, is moored on the south end of the shoal extending south from Dark Island.

Light-buoy.—Haskell Shoal, with 16 feet (4^{m}9) of water over it, lies one mile above Dark Island; on the north side of the shoal is moored black light-buoy 17 T, showing a *flashing green* light.

Sister Islands, in United States waters, and consisting of three small islets joined by causeways, and entirely occupied by the lightkeeper's residence, lie nearly 400 yards (365^{m}8) southward from the northeast portion of Grenadier Island, and are nearly midway between Chippewa Point and Grenadier Island lighthouse.

Light.—On the northeasternmost of Sister Islands is erected a grey square tower, which at a height of 47 feet (14^{m}3), exhibits a *flashing red* light, *every 3 seconds,* visible 12 miles.

Shoals, with as little as 2 feet (0^{m}6) of water on them, extend a quarter of a mile southwest from Sister Islands.

A rock, awash, lies 300 yards (274^{m}3) from Grenadier Island and half a mile westward of Sister Islands light.

Buoy.—Empire Shoal, with 16 feet (4^{m}9) of water over it, lying 1½ cables southward of Willoughby Islands, is marked by red conical buoy, No. 10.

Light.—A black skeleton tower, with a white tank house standing in 5 feet (1^{m}5) of water, 750 feet (228^{m}6) northwest of Third Brother Islet, exhibits, at a height of 38 feet (11^{m}6), a *flashing white* light.

Pilot Island.—Two small islands, **Willoughby** and Pilot, having deep water close to their southeast sides, lie 4 cables, and half a mile, respectively, northeastward from Sister Islands lighthouse. Pilot Island is small, but its trees stand out well from the northeast, being seen, when on the track, a little to the right of Sister Islands lighthouse.

Scow Island Outer Shoal.—Buoy.—An islet, called Scow Island, lies half a mile north of the southwest end of Oak Island (*see* below); and, half a mile northwest of Scow Island, marking Scow Island Outer Shoal with 2 feet (0^{m}6) of water on it, is moored black can buoy No. 13, 1½ miles northeast of Sister Islands light.

Chart 1457.

A patch with 8 feet (2m4) on it, called **Scow Island Inner Shoal,** lies midway between the buoy and Scow Island; and, one with 12 feet (3m7) of water on it, called **Lower Scow Island Shoal,** is situated three-quarters of a mile northeast of the buoy.

Round Island, the central one of a group of islets lying near the southeast side of Grenadier Island, and about 10 feet (3m0) high, is situated 1¾ miles northeastward of Grenadier Island light, and over 1½ miles southwest from Sister Islands light.

Shoals.—Southeastward, 300 yards (274m3) from Round Island, are **Round Island Shoal** with 10 feet (3m0), **Slim Island Shoal** with 7 feet (2m1) of water, and the less important **Poverty Island Upper Shoals,** lying near the divergence of the Canadian and American channels.

Oak Island.—From Chippewa Point, the New York shore trends southeasterly 2 miles, to Chippewa Bay Village, to which 5 to 6 feet (1m5 to 1m8) water can be carried across the extensive flats fronting it. Oak Island, thickly wooded, and 1¾ miles long, is situated in the upper portion of Chippewa Bay; and midway between the island and Chippewa Point are several smaller islands, the outer cluster being known as **Cedar Islands** *(Lat. 44° 27′ N. Long. 75° 48′ W.)*, and lying 1¾ miles westward of Chippewa Bay Village. There is a boat landing on the southeast side of the largest Cedar Island.

Goose Bay.—From the southwest end of Oak Island, the shore runs in a southwesterly direction 3¾ miles to the entrance to Goose Bay, suitable only for small craft. Fronting this section of the shore are **Halfway, Hemlock, Third Brother, Lone Brother,** and **Ironsides Island.** Lone Brother, small and north of the ship channel, has shoal water extending 330 yards (301m7) from its southwest side. Ironsides Island is densely wooded, and high, its northwest side being cliffy. A rock, with less than 6 feet (1m8) of water on it, lies about 100 yards (91m4) west of its northwest point.

Ironsides Shoal.—Light-buoy.—This rocky patch with 3 feet (0m9) of water on it lies a quarter of a mile west of Ironsides Island. A red light-buoy, No. 12, showing a *flashing red* light, is moored in 17 feet (5m2) of water on the south side of this shoal.

Alexandria Bay.—From Goose Bay, the New York shore continues in the same direction 3½ miles to the summer resort, Alexandria Bay. For 1¾ miles southwest of Goose Bay, the shore is fronted by several islands known as **Excelsior Group,** between which, and **Summerland Group,** a third of a mile northwest of it, is the channel to Alexandria Bay and Upper Narrows. (*see* page 146). **Resort Island** *(Lat. 44° 22′ N., Long. 75° 54′ W.)*, about 15 feet (4m6) high, at the upper end of Excelsior Group, and nearest to the ships' track, has a handsome villa with pagoda-like roof erected on it, and is a conspicuous feature on the course between Sister Islands light and Alexandria Bay. The highest islands of Summerland Group are 40 to 60 feet (12m2 to 18m3) high. The wharves at Alexandria Bay are available for boats of 11-foot (3m4) draught and are easily approached from the channel. There is a small bay, on the northeast side of the village, affording anchorage for boats drawing from 6 to 11 feet (1m8 to 3m4) of water.

Chart 1457.

A ferry runs from Alexandria Bay to Westminster Park, Thousand Islands Park, and Rockport. Alexandria Bay possesses several very fine hotels, the southwestern one, the Thousand Islands hotel, laying a very conspicuous principal tower, somewhat rounded at the top, and affording a useful steering mark from the northeast. The central, principal tower of the Crossman hotel is square.

Chart 1458.

Lights.—Sunken Rock.—On a reef, half a mile northeast of Alexandria Bay Village, is erected a white conical tower, from which, at a height of 30 feet (9m1), is exhibited a *fixed green* light. The small pier, upon which the tower is erected, has a small boathouse on it. Vessels pass northwest of this light if not stopping at Alexandria Bay.

Sunken Rock Shoal.—On the west edge of the reef is erected a black, square skeleton tower on a white tank house that, at an elevation of 28 feet (8m5) exhibits a *flashing white* light. The light is unwatched.

Buoys.—Southwestward of Sunken Rock Shoal lighthouse are two dangers named **Frontenac Shoal,** and **Broadway Shoal.** The first is marked by red spar buoy No. 14, and, Broadway Shoal, by a red and black horizontally-striped can buoy. They bear, respectively, from Sunken Rock Shoal lighthouse, 243° distant 2 cables, and 200° distant 1½ cables.

Wellesley Island, in United States waters, extends 8 miles southwest from Rockport, being separated from the southeast shore by the principal ship channel known as Upper Narrows (*see* page 146). The southeastern portion of Wellesley Island rises to a height of 144 feet (43m9). **Lake of the Isles** on the northeast, and **Eel Bay** on the southwest, both shallow, almost divide the island. On the northwest and northeast extremities are situated **Grand View Park** and **Westminster Park,** summer resorts. From the latter, islands, most of which have summer cottages on them, extend northeastward 1¾ miles, those nearer Wellesley Island being named **Manhattan Group,** and those, the most distant therefrom, being known as Summerland Group, already alluded to. Westminster Park has a depth of 8½ feet (2m5) at the deeper of its two wharves.

Charts 1457, 1458.

Deer Island.—A red spar buoy, with band of red reflectors, is moored on the northern side of the channel, northward of Deer Island, and 4,250 feet (1,295m4), 192°, from Grenadier Island light.

Whiskey Island *(Lat. 44° 23′ N. Long. 75° 53′ W.),* isolated, small, bushy, and about 10 feet (3m0) high, is the northeastern islet of the Summerland Group, and lies between the American and Canadian channels.

Whiskey Island Shoal.—Light-buoy.—Whiskey Island Shoal consists of two spots, with 14 and 17 feet (4m3 and 5m2) of water over them, with deeper water between. The southerly spot of 14 feet (4m3) is marked by red buoy, No. 12 A, showing a *flashing red* light, moored on the north edge of the shoal, 3⅓ cables, south of the south end of Whiskey Island.

Light.—On the north side of the Excelsior Group a black skeleton tower exhibits, at an elevation of 34 feet (10m4), a *flashing white* light. The light is unwatched.

Charts 1457, 1458.

Grenadier Shoal, with a least depth of 14 feet (4^{m}3) over it, lies about in the middle of the passage, between Grenadier Island and Summerland Group, 2 cables westward of Whiskey Island. The Canadian channel passes northwest of this shoal.

From the northeastern islands on the Summerland Group, a bank, with 3 feet (0^{m}9) of water on it, extends northward for 2 cables.

Hill Island, 3½ miles long, in the Province of Ontario, is situated close northwest of the northeastern portion of Wellesley Island, and attains a height of 140 feet (128^{m}0).

Club Island, 60 feet (18^{m}3) high, and over three-quarters of a mile long northeast and southwest, lies in the lower entrance to Raft Narrows, and 315 yards (288^{m}0) south of the Rockport shore, the Canadian channel, here being 40 fathoms (73^{m}2) deep.

Charts 1443, 1457, 1458.

Directions, Prescott to Alexandria Bay and Rockport.—(For directions Prescott to Cornwall, *see* page 128). A vessel from either Prescott or Ogdensburg will keep the middle of the river for 7½ miles, to half a mile above Maitland, the mid-channel course being 223°, when to avoid Catamaran Shoal of 12 feet (3^{m}7) marked by a black can buoy, keep nearer the Canadian shore until close to McNair Island, steering 233°. Thence pass in mid-channel between McNair light and North McNair Shoal red light-buoy, and if not calling at Brockville, steer 223° for 2·1 miles, until abreast Skeleton Island light and Conran Island Shoal buoy on the port side. Now steer 232° in mid-channel, until abreast Royal Island light, when steer 222° for 3½ miles, passing McCoy Island Shoal and DeWattville Island Shoal light-buoys to port and Coronation Shoal red light-buoy and Needles Eye light to starboard. When 1½ miles above DeWattville front light, these leading lights will be seen in one astern, alter course to 218° for 1¼ miles, passing the abandoned lighthouse on Cole Shoal and Cole Shoal red light-buoy to starboard, and passing on the port side the black spar buoy on Cole Ferry Shoal, and a black light-buoy a third of a mile above Cole Shoal red light-buoy. When 7 cables above this black light-buoy, steer 193° for 2·5 miles, passing to starboard the light on Bay State Shoal, a red conical buoy and a red light-buoy, and passing to port two black light-buoys and a black can buoy. When abreast of Allen Dock, steer 217° for 3·5 miles, passing a red light-buoy and two red conical buoys to starboard, and Superior Shoal light to port. When abreast Haskell Shoal light-buoy to port, steer 209° for 1·9 miles to abreast Sister Island light and with Third Brother Island Shoal light to port, steer 206° for 1·4 miles. When Ironsides Shoal light-buoy is abeam, steer 227° for 2·5 miles, until abreast the upper end of Summerland Island, passing Whiskey Island Shoal light-buoy to starboard and Excelsior Group light to port. Now steer 217° for 2 miles, passing Sunken Rock light and Sunken Rock Shoal light to port, when proceed to the wharves at Alexandria Bay, or continue through Upper Narrows to Lake Ontario or Kingston as directed on page 163.

If proceeding by the Canadian channel a vessel may follow the same course until abreast Ironsides Shoal red light-buoy, when steer 248° until abreast and one cable off Grenadier Island light. Now haul a little more westward, steering 252°, for the entrance to Raft Narrows between Club Island and Rockport or proceed to the pier at the latter. (For directions Rockport to Gananoque and Kingston, *see* page 164, and for Rockport to Prescott, *see* below.)

Charts 1443, 1457, 1458.

Alexandria Bay to Prescott.—If from Lake Ontario pass northwest of Broadway Shoal red and black-striped buoy and southeast of Frontenac Shoal red spar buoy 14, (page 139) northward of Sunken Rock Shoal light and Sunken Rock light and steer 037° for 2 miles, until abreast the upper end of Summerland Island. Now, steer 047° for 2·5 miles, passing Excelsior Group light to starboard and Whiskey Shoal light-buoy to port, and, when abreast Ironsides Shoal light-buoy, steer 026° for 1·4 miles to abreast Sister Island light, and thence 029° for 1·9 miles to Haskell Shoal light-buoy.

If from Rockport, pass one cable south of Grenadier Island light, and thence steer 068°, to pass a cable south of Ironsides Shoal light-buoy.

When abreast Haskell Shoal light-buoy, steer 037° for 3·5 miles, until 2 cables below the light-buoy off Blind Bay. Now steer 013° for 2·5 miles, passing the light on Bay State Shoal to port, and two light-buoys and a can buoy to starboard. When DeWattville leading lights come in line, steer on them, heading 038° for 1¼ miles, passing on this course Cole Shoal red light-buoy to port, and passing to starboard a black light-buoy a third of a mile above Cole Shoal red light-buoy and Cole Ferry Shoal black spar buoy. From a point 1½ miles above DeWattville front light, steer 042°, until abreast Royal Island light, and pass in mid-channel through Brockville Narrows, passing Needles Eye light and Coronation Shoal light-buoy to port and DeWattville Island and McCoy Island Shoal light-buoys to starboard. From abreast Royal Island light-buoy, steer 052°, until abreast Skelton Island light, passing Conran Island Shoal light-buoy to starboard. Steer 043°, to pass midway between McNair Island light and North McNair Shoal light-buoy, and when abreast the light, head 053° for 3·1 miles, passing to port of Catamarin Shoal which is marked by a black can buoy. Now keep in mid-channel, steering 043°, until arriving at Prescott or Ogdensburg. (If continuing on downstream *see* page 128; if entering Ogdensburg Harbour, *see* page 125).

CHAPTER VIII

ROCKPORT AND ALEXANDRIA BAY TO KINGSTON AND LAKE ONTARIO

Chart 1458.

Canadian Middle Channel.—A channel extending from the head of Grenadier Island, through the Raft Narrows, and Fiddlers Elbow, and on to the open water between Wolfe and Howe Islands was established in 1915. It has a least width of 300 feet (91^{m}4), and least depth of 20 feet (6^{m}1), swept to 18 feet (5^{m}5) and dredged where necessary. Numerous buoys and beacons outline this channel., (For directions *see* page 164, Rockport to Kingston by Middle Channel.)

Raft Narrows.—Garrett Point.—From Rockport (*see* page 135), the Canadian shore of the St. Lawrence River runs in a general westerly direction, 4⅓ miles, to Garrett Point, the low neck at the back giving the point an insular appearance. Between Hill Island and Garrett Point lie a group of islands, 2⅓ miles long, the cluster nearest Garret Point being known as **Sherbrooke Islands.** The two largest between Garett Point and the west part of Hill Island, are named Lynedoch and **Wallace Islands,** the passage between them being known as Fiddlers Elbow. The channel, east of the latter, is named the Raft Narrows.

The north shore of the Raft Narrows is bold, rising quickly to a height of 80 to 140 feet (24^{m}4 to 42^{m}7), and the water is deep close to the shore. **Surveyor Island** in the mouth of **Bucks Bay** on the north shore, seven-eighths of a mile east of Fiddlers Elbow, with its red roofed cottage and flagstaff, is a good guide for the channel, and may be passed close south of. On the south side of the channel, between **Club Island** and Fiddlers Elbow, there are a few cottages.

Ivy Lea *(Lat. 44° 22′ N. Long. 76° 01′ W.)* is a summer resort on the main shore of the bay close northward of Garrett Point. The bay contains the Sherbrooke Group of islands lying between the mainland and Lynedoch Island. Communication is had by road with Landsdowne station and highway, four miles back.

Bridge.—The Thousand Islands International bridge crosses the river about 1½ miles eastward of Ivy Lea to Collins Landing, N.Y. The bridge over the Canadian channel to Georgina Island is a suspension bridge with a main span 750 feet (228^{m}6) long and clearance of 120 feet (36^{m}6). A steel arch 348 feet (106^{m}1) long crosses Lost Channel to **Constance Island,** and a continuous truss of two 300-foot (91^{m}4) spans from Constance Island to Hill Island. The International Rift bridge between Hill and Wellesley Islands is a 90-foot (27^{m}4) rigid frame arch span of reinforced concrete. The bridge across the Upper Narrows from Wellesley Island to Collins Landing is a suspension bridge with an 800-foot (243^{m}3) main span and clearance of 150 feet (45^{m}7) above the water.

Shoal.—A rock shoal, with about 3 feet (0^{m}9) of water over it, makes out south to mid-channel from the small island lying just west of Constance Island. There is good water for small boats on the Rabbit Island side.

Chart 1458.

Fiddlers Elbow.—At **Wood Island,** 200 yards (182^{m}9) northeastward of Lynedoch Island, two channels are provided; the Fiddlers Elbow for upward bound vessels, and the dredged cut south of Wood Island for downward bound vessels. From the junction of these channels, mid-channel is kept, until past the light on the island south of Lynedoch Island. There is a house on the northeast end of Wood Island and the southwest end is cliffy. There are several summer cottages northwest of Wood Island.

Buoys.—Two red spar buoys, one black spar and a red and black buoy, mark shoals northwestward of Wood Island.

Light.—From a steel skelton tower on the south side of Wood Island, a *flashing red* light is exhibited at a height of 20 feet (6^{m}1).

The current in the channel southeast of Wood Island has a mean rate of about 2¼ knots.

Lynedoch Island.—Light.—This island is situated at the southwest end of Fiddlers Elbow. On the northwest point of the small island opposite the upper end of Lynedoch Island is erected a white, square wooden structure, that, at a height of 40 feet (12^{m}2), exhibits a *flashing green* light.

Buoy.—A black spar buoy is moored on the west extreme of the shoal off the small island south of Lynedoch Island, a black spar buoy is moored about a quarter of a mile north-northwestward of the northern extremity of Lynedoch Island.

A pinnacle rock, awash, with a top area of about 15 square feet, lies 440 yards (402^{m}3) southwest of the southwestern tip of Lynedoch Island and nearly on line from that point to Sir William Island.

Horseblock Point.—From Garrett Point, the shore continues in the same direction 2½ miles to Horseblock Point, close northwest of which is **Landon Bay.**

Navy Islands form a group lying 1¾ miles southeast, and 1¼ miles southwest of Horseblock Point, the largest and southwestern one being known as **Stave Island,** separated from **Prince Regent Island** by Gananoque Narrows. A number of the islands in the Navy Group have been named after commanders of British gunboats, and survey vessels on the St. Lawrence River and Great Lakes in the years 1812 to 1817.

Light.—A *flashing red* light is shown from a 4-foot (1^{m}2) standard on the west side of a rock in the narrow channel between Stave and Downie Islands, 300 yards (274^{m}3) west of the west end of the latter island. This light is privately maintained and is unwatched.

Buoys.—Sir William Island, bushy and 10 feet high, which may be considered as the eastern of Navy Islands, has several rocky patches with 3 to 9 feet (0^{m}9 to 2^{m}7) of water over them lying 300 yards (274^{m}3) southeast and southwest of it, in addition to which is **Steeple Shoal** with a depth of 2 feet (0^{m}6) over it; a red light-buoy, showing a *flashing red* light, is moored on the western side of the shoal. the partly wooded island, 200 yards (182^{m}9) southeast of Steeple Shoal, is about 15 feet (4^{m}6) high.

A black spar buoy is moored on the 7-foot (2^{m}1) patch, about 200 yards (182^{m}9) southeast of Steeple Shoal and a black spar buoy is moored about a third of a mile north-northeastward of Steeple Shoal.

Chart 1458.

Fair Point *(Lat. 44° 20′ N. Long. 76° 07′ W.)*, on the Canadian side, is 2½ miles westward from Horseblock Point, the deep indentation between them taking the names of **Landon** and **Holsted Bays,** the village in the latter having a landing wharf.

The Lake Fleet is the name given to a group of small islands, 3¾ miles long northeast and southwest, lying in Canadian waters between Stave Island and the northwest portion of Grindstone Island. Individual islands of the group bear the names of British gunboats and surveying vessels operating on the St. Lawrence River in the years 1812 to 1817. The largest of that portion of The Lake Fleet group, lying 380 yards (347^{m}5) north of Grindstone Island, is named **Camelot Island.** That almost joining the northeast side of the latter is named **Niagara Island.** The track, known by some as Middle Channel, passes close along the northwest sides of both these. Three quarters of a mile westward of Camelot Island is a small broken islet called **The Punts Islands.** The two shoals which formerly lay north of these islands have been removed.

Buoys.—The following buoys mark the above channel:—

(1) A red spar buoy moored on the west edge of a 9-foot (2^{m}7) spot lying about 1¼ miles northeastward of Gananoque Narrows light.

(2) A black spar, moored on the northern edge of a rocky patch with 5 feet (1^{m}5) of water over it, lying about three-quarters of a mile east of Gananoque Narrows light.

(3) A red spar, moored on the northwestern edge of a patch with 9 feet (2^{m}7) of water over it, lying about 1,700 feet (518^{m}2) westward of (2); the channel is between (2) and (3).

(4) A black spar, moored on an 11-foot (3^{m}4) spot, about 330 yards (301^{m}7) northwest of **Fort Wallace Island.**

(5) A red spar, moored south of **Bloodletter Island.**

(6) A red spar is moored at the southern edge of the shoal water extending southwestward from **Dumfounder Island.**

(7) A red spar is moored on the south extreme of a 4-foot (1^{m}2) shoal lying 170 yards (155^{m}4) south of Bass Island.

(8)A black spar is moored on the northwest edge of a 7-foot (2^{m}1) shoal half a mile off the northwest coast of Grindstone Island.

Gananoque Narrows *(Lat. 44° 19′ N. Long. 76° 05′ W.)*, as before stated is the passage, only 100 feet (30^{m}5) wide, between Prince Regent and Stave Islands, the former being the northeastern island of The Lake Fleet Group, and the latter, the southwestern of Navy Islands.

Light.—On the northeast extreme of Prince Regent Island is erected a white, square tower, which, at a height of 44 feet (13^{m}4), exhibits a *flashing white* light. The light is unwatched.

Buoys.—A red spar buoy is moored, about 260 feet (79^{m}2) northeast of the lighthouse, vessels passing between the later and the buoy.

On the shoal, extending for 170 yards (155^{m}4) northeast of **Princess Charlotte Island,** is placed a black spar buoy, which should be left to the southward.

Northward of Gananoque Narrows are two small clusters of boulders, 3 feet (0^{m}9) high, situated 260 yards (237^{m}8), 290°, and 160 yards (146^{m}3), 325°, respectively, from the lighthouse on Prince Regent Island. A rock, 2 feet

Chart 1458.

(0m6) high, lies 650 yards (594m3), 273°, from the same point. These three dangers must be carefully avoided at night, by keeping the northwest coast of Prince Regent Island aboard.

Gananoque, built upon both sides of the river of that name, is 18 (16 nautical) miles by water, and 25 miles by the Canadian National Railways from Kingston. It is, also, nearly 2⅓ miles westward from Fair Point, the shore between them, 40 feet (12m2) high, being fronted by a bank a quarter of a mile wide under the depth of 18 feet (5m5).

A ferry runs to Clayton, New York. The town bridge crosses the river a third of a mile from the mouth and another bridge is located near the mouth. Gananoque had, in 1951, a population of 4,572.

Wharves.—The depth at the wharves lying east of Gananoque River and in the channels leading to them is 11 feet (3m4). The entrance of the Gananoque River and along the face of the wharves in the river and up the channel for a distance of 800 feet (243m8) above the first bridge has been dredged. The east side of the entrance of this channel is marked by three red spar buoys. A wharf at the foot of Clarence Street, on the west side of the mouth of the river, was constructed in 1935. There is a depth of 6½ feet (1m9) on both sides of the wharf and a basin, extending southward from the wharf 400 feet (121m9) long and 250 feet (76m2) wide, has been dredged to a depth of from 6½ to 8 feet (1m9 to 2m4). A channel, with the same depth, connects this basin with the deep water of the St. Lawrence River. The south side of the basin and channel is marked by three black spar buoys.

Intake Pipe.—An intake pipe lands on the point just west of the mouth of the Gananoque River.

Ferry channel.—Buoys.—For the accommodation of the ferry from Gananoque to Clayton, New York, a channel 500 feet (152m4) long, 200 feet (61m0) wide between **Tidds** and **Forsyth Islands,** has been dredged to 12 feet (3m7). The channel is buoyed.

Jackstraw Island *(Lat. 44° 20′ N. Long. 76′ 07′ W.)*—Lying three-quarters, and, one-third of a mile, respectively, southeast of Fair Point, are **Gordon** and Jackstraw Islands, the former about 400 yards (365m8) northward of the ship's track.

Between these and the mainland shore lie **Sisters, Dobbs, Perch,** and **Hog Islands;** between the latter island and Horseblock Point, 1¼ miles to the eastward, lie Holsted and Landon Bays.

Jackstraw Shoal.—Light.—From Jackstraw Island, shoals, one of which is uncovered, extend over a half a mile in a southwesterly direction, and, on the southwesternmost of these patches is erected a white square tower, which, from a height of 34 feet (10m4), exhibits a *flashing red* light. The light is unwatched.

Buoy.—A red spar buoy, with red reflector band, is moored on the southern side of a stone pier, formerly the foundation of Jackstraw Shoal light, close southward of the present light.

Buoyage.—Corn Island, partially wooded, and about 10 feet (3m0) high, is situated half a mile southwest of Jackstraw Shoal lighthouse, and three quarters of a mile northeast of Admiralty Islands (*see* page 149) being connected thereto by a shallow bank, which continues northeast of Corn Island as far as

Chart 1458.

The Lake Fleet group (*see* page 144). On the northeast edge of this bank is moored a black spar buoy, with white reflector band, marking the south edge of the channel, southeast of Jackstraw Shoal light.

Upper Narrows.—Thousand Island Park is situated on the southwest extremity of Wellesley Island, and was formerly called Talavera Head. The channel southeast of Wellesley Island, from Thousand Island Park to Alexandria Bay, and the principal thoroughfare, is known as Upper Narrows. At Thousand Island Park landing pier, there is a depth of about 9 feet (2m7), the pier being marked by an arc lamp. The approach from the river channel is narrow and full of rocks.

The principal places on the New York side of Upper Narrows, southwest of Alexandria Bay, are **Point Vivian, St. Lawrence Park, Collins Landing,** and **Fishers Landing,** the latter situated at the southwest entrance. **Swan Bay,** a shallow inlet between St. Lawrence Park and Collins Landing, is situated near the middle of the Narrows, and opposite a smaller indentation in Wellesley Island, named **Brown Bay.**

Light.—A red skeleton tower, with a white tankhouse, erected near the middle of the southeast coast of Wellesley Island, opposite St. Lawrence Park, exhibits, at a height of 34 feet (10m4), a *fixed red* light. This light is unwatched.

Bridge.—*See* page 142.

Light.—Pullman Shoal.—On Pullman Shoal, a third of a mile westward of Alexandria Bay, is erected a red skeleton tower, with a white tankhouse, in 5 feet (1m5) of water, which at an elevation of 34 feet (10m4), exhibits a *flashing red* light; the light is unwatched.

Comfort Island Shoal.—For a mile above Alexandria Bay there extends a chain of islands, all on the south side of the channel. The uppermost one is **Comfort Island,** and southwest for 200 yards (182m9) from it extends a shoal with 2 feet (0m6) of water over it.

Light.—On the west end of Comfort Island Shoal is erected a black skeleton tower with a white tankhouse, which, from a height of 28 feet (8m5), exhibits a *flashing white* light.

Niagara Shoal.—Buoy.—Between Fishers Landing, and Fineview on Wellesley Island, at the southwest entrance of Upper Narrows, there is a cluster of islets, the western of which is known as Rock Island (*see* below). The northeastern islet of the group lies half a mile from Fishers Landing, and 200 yards (182m9) northwest of a projecting point from the main shore. Northwest 300 yards (274m3) from this point is Niagara Shoal, with 2 feet (0m6) of water on it, marked by a black spar buoy, bearing 050°, distant 3,800 feet (1,158m2) from Rock Island light. In the bight of the main shore for a mile northeast of this shoal, shallow water extends off a quarter of a mile, the Wellesley Island side of the Narrows being the deeper.

Fineview Pier *(Lat. 44° 17′ N. Long. 76° 01′ W.)*, with a depth of 7 feet (2m1) along the face, is situated on the south extreme of Wellesley Island, a quarter of a mile southeast of Thousand Island Park. The pier is reported to be in ruins.

Granite State Shoal is the name given to the southern edge of the shallow rocky bank extending a quarter of a mile southwest from Fineview.

Chart 1458.

Lights.—On the east point of Granite State Shoal is erected a red skeleton tower, with a white tankhouse, which at a height of 28 feet (8m5), exhibits a *flashing white* light. This light is unwatched.

Fishers Landing.—A white spindle on a rock, 800 yards (731m5) southeast of Granite State Shoal light, at an elevation of 11 feet (3m4) exhibits a *flashing green* light.

Buoy.—A red conical buoy is moored, in 16 feet (4m9) of water, on the upper end of Granite State Shoal.

Rock Island.—Light.—On the western islet of the group, in the southwest entrance to Upper Narrows, is erected, on the outer end of a small pier, a white conical tower, which, at a height of 50 feet (15m2), exhibits a *fixed green* light. The ship channel is northwest of this lighthouse, and southeast of Granite State Shoal lighthouse.

Light-buoy.—A black light-buoy, No. 25, showing a *flashing white* light, is moored on the north side of a 17-foot (5m2) spot, lying nearly three-eighths of a mile north of Masons Point.

Clayton *(Lat. 44° 14′ N., Long. 78° 05′ W.)*—From Fishers Landing, the shore trends in a general southwesterly direction 4½ miles to Clayton. The depths at its wharf range from 6 to 18 feet (1m8 to 5m5). A ferry runs to Thousand Island Park and Gananoque. Clayton is a station of the New York Central Railway.

A quarter of a mile east of Clayton is **Washington Island** separated from the mainland by a shallow, rocky flats.

Three quarters of a mile, and 2 miles southwest of Fishers Landing, are **Blind** and **Spicer Bays.**

Round Island, on which is situated the summer resort, **Round Island Park,** is a mile northeast of Clayton and between it and Spicer Bay, being separated from the shore by a channel 300 yards (274m3) wide. A breakwater for the protection of power boats runs out 200 yards (182m9) in a northeast direction. The steamer pier is on the middle of the northwest side of Round Island, between which and **Little Round Island,** there is a depth of 13 feet (4m0).

North Colborne Island.—Northwest of the middle of Round Island lie two small islands, the outer one being named North Colborne, the north side of which has deep water close to it.

Light-buoy.—A black light-buoy, No. 25 A, showing a *flashing green* light, is moored close westward of North Colborne Island.

Chapman Shoal.—A quarter of a mile west from the northwest point of North Colborne Island is a rock, just above water, called Chapman Shoal.

Light.—On Chapman Shoal is erected a red skeleton tower, with a white tankhouse, which from a height of 28 feet (8m5), exhibits a *flashing white* light. This light is unwatched.

Gull Island, quite small, with rocks extending 200 yards (189m2) from its eastern side, lies a third of a mile northward of North Colborne Island, and a quarter of a mile, 070°, from it lies a shoal, with 2 feet (0m6) of water over it.

Chart 1458.

Beckwith Island, considerably larger than Gull Island, lies 600 yards (548m6) westward of the latter. A 5-foot (1m5) patch lies 250 yards (228m6) off its east shore.

Calumet Island is the largest of three, lying half a mile north of Clayton, the ship channel passing between. It is crowned by a very prominent summer mansion, north of which is erected an equally conspicuous tower with a pagoda-like roof, and gallery.

Shoals.—A shoal bank with from 7 to 14 feet (2m1 to 4m3) of water on it extends half a mile toward Chapman Shoal light from the east side of Calumet Island. Near the end of this bank a detached spot, with 7 feet (2m1) of water on it, lies 237° distant 3½ cables from Chapman Shoal light. A bank, with rocks awash, lies 1,600 feet (487m7) west of **Little Calumet** Island.

A shoal patch, with 3 feet (0m9) of water over it, lies 470 yards (429m8), 260° from the southwest point of Beckwith Island.

Clearing mark.—Rock Island light in line with the northwest extreme of North Colborne Island, bearing 058°, leads southeast of the shoals from Calumet Island.

Eagle Wing Group.—The channel between Calumet Island and Grindstone Island is practically closed to everything but power boats, by a group of small islets and shallow spots, called Eagle Wing Group.

Prospect Park *(Lat. 44° 14′ N. Long. 76° 06′ W.)* is situated upon a bluff and conspicuous point three-quarters of a mile westward of Clayton; **French Creek,** crossed by a bridge, running out between them. Prospect Park Point is crowned by a conspicuous house with a tower a little south of it. The site of the house is about 100 feet (30m5) above the water. The southwest side of the point is composed of a yellow cliff.

Light.—On **Bartlett Point,** the north extreme of Prospect Park Point, is erected a black pyramidal skeleton tower which, from an elevation of 35 feet (10m7), exhibits a *fixed green* light. This light is unwatched.

Light.—Light-buoys.—Buoy.—A red light-buoy No. 20, showing a *flashing* red light, is moored on a 10-foot (3m0) spot 3,000 feet (914m4) northeast of Bartlett Point light.

At the outer end of the concrete pier belonging to the Standard Oil Co. of New York, on the north side of Washington Island, a *fixed green* light is shown. A black light-buoy, showing a *white flash,* is maintained by Consaul-Hall Co., on a shoal about 1,250 feet (381m0) 252° from Washington Island light. A black can buoy, 27, with white reflector, marks a 17-foot (5m2) spot on the south side of the ship channel about 2,300 feet (701m0) 060° from Bartlett Point light.

Linda Island, 5½ miles westward of Prospect Park is a small island separated from the shore by a boat passage 150 yards (137m2) wide. Between Prospect Park and Linda Island the shore is fairly regular with good water close in.

A shoal, with 10 feet (3m0) of water on it, lies 257°, three-quarters of a mile from the southwest end of Linda Island.

The water is deep close to this part of the shore, which rises to a height of 105 feet (32m0). The village of **Riverview** is at a small creek called **Mellen Bay** 2¾ miles westward of Linda Island.

Chart 1458.

Light.—A white, square, skeleton tower, erected off the north end of Linda Island exhibits, at a height of 33 feet (10^{m}1), a *flashing white* light.

The light shows a *red flash,* when bearing between 066° and 076°, covering the rocky patch, with 10 feet (3^{m}0) of water over it, described above. This light is unwatched.

Grindstone Island, in the United States waters, is a ragged island 5¾ miles long northeast and southwest, by 2⅓ miles in width near its western end, where it rises to a height of 120 feet (36^{m}6). On the flat, extending 2⅓ miles southwest from Thousand Island Park on Wellesley Island, is a group of islands separated from Grindstone Island by a deep, unbuoyed channel, with several middle-grounds, leading from the American to the Canadian channel. Large quantities of granite have been taken from a quarry situated on the high eastern side of the island and showing conspicuously from the Canadian channel.

The village of Grindstone is situated about the shores of a little bay on the northwest side of the island, and across the Canadian Middle Channel from Thwartway Island.

Francis Island, three-quarters of a mile long northwest and southeast, is the largest of a group lying between Grindstone and Wolfe Islands. The island is partly wooded, about 50 feet (15^{m}2) high, and from the southwest presents a clay cliff. **Black Ant Island,** small, with a smaller island lying close west of it is about half a mile to the northward of Francis Island. **Arabella Island** lies close south of the latter. These islands are situated in Canadian territory. Northeastward of this group is a passage used by the ferry steamer between Gananoque and Clayton. **Francis Island** stands upon a shallow bank, known as **Blanket Shoals,** which stretches one mile southeastward from that island, terminating in a rock, 300 feet (91^{m}4) long and 2 feet (0^{m}6) high, known as **Rock West.** Half a mile eastward of the latter is a bare islet, 5 feet (1^{m}5) high, called **Blanket Island,** steep-to on its south side. Blanket Shoals, at one time, extended to Wolfe Island, but the bank has now dredged through it a channel 300 feet (91^{m}4) wide, 16 feet (4^{m}9) deep, and half a mile long, close to the northeast extreme of Wolfe Island and named **Wolfe Island Cut.**

Buoyage.—The south and north entrances of this cut are marked by red light-buoys, showing *flashing red* lights, and moored 3,300 feet (1,005^{m}8) southeast and 700 feet (213^{m}4), respectively, northeast of Wolfe Island light (*see* page 152). The cut is also marked by one red and three black spar buoys between the light-buoys. The northern and southern of the black spar buoys are equipped with radar reflectors.

Admiralty Islands.—In the triangular space between Gananoque, the northwest point of Grindstone Island, and the east extremity of Howe Island, is a group named Admiralty Island, under various names, these having been so named after various members of the British Admiralty who held office around the years 1812-1814. The southern large island, named **Thwartway Island,** (*Lat. 44° 18′ N., Long. 76° 09′ W.*) is separated from Grindstone Island by a passage 400 yards (365^{m}8) wide know by some as Middle or Canadian Channel (*see* page 142).

Some of these islands, such as Burnt and Beaurivage, are in the St. Lawrence Islands National Park. On Beauvirage, just east of Red Horse Rock light, is the site of a summer camping ground.

Chart 1458.

Shoals.—Buoys.—Beacon.—Bass Island is the name given to an islet lying 300 yards (274m3) southwest from the south extremity of Thwartway Island. Southward, 150 yards (137m4) from Bass Island, is a patch with 4 feet (1m2) of water on it, marked by a red spar buoy, which a vessel using Middle Channel must be careful to leave to the northward. **Bass Rock Island,** small, lies on the northwest side of the vessels' track, and 300 yards (274m3) eastward of Bass Island. A bank, with 2 feet (0m6) of water upon it, lies half a mile northwestward of the same island. A black spar is moored, on a 7-foot (2m1) spot, 1,920 feet (585m2) southwest of the above red buoy. (For buoys, *see* page 144).

Buoys.—Juniper Island is almost connected to the northwest extremity of Thwartway Island, and, between the shoals lying westward of it, a black light-buoy, showing a *flashing white* light, and a red buoy are placed for the use of the ferry steamer plying between Gananoque and Clayton, the track passing 300 yards (274m3) westward of Juniper Island.

Melville Island.—Buoys.—The large eastern island of the group is called Melville Island, and westward of it, between it and Forsyth Island, are placed, for the use of the same steamer, a red and a black spar buoy.

Spar buoys also mark the continuation of this channel between Forsyth and Tidds Islands leading towards Gananoque.

Light.—Burnt Island.—The two southwestern islands of the Admiralty Group are known as Mermaid and Burnt Islands, between which there is a passage. On Burnt Island, the nearest to Howe Island and connected therewith by a shallow bank, is erected, on its eastern side, a white rectangular structure with a square lantern on the middle of the roof, which at a height of 49 feet (14m9), exhibits a *flashing white* light. The east side of Burnt Island falls suddenly to deep water, and, at the lighthouse, a vessel might tie up to the rocky coast. Near the light, there is a small wharf for landing at the park on Burnt Island.

Tin Cap Shoal.—Buoy.—A red and black horizontally-striped spherical buoy is moored on a rock called Tin Cap Shoal, about 200 yards (182m9) east from Burnt Island light. The track for heavy draught vessels is between the above buoy and the lighthouse; but light draught vessels using the narrow passage through Admiralty Islands pass southeast of it.

Light.—Redhorse Rock.—The nearest Admiralty Island to Sheriff Point, described below, is named **Beaurivage Island,** and, on its southwest extremity, is erected, upon a short pier, a white square building, which, at a height of 28 feet (8m5), exhibits a *flashing white* light called Redhorse Rock light.

Anchor Shoal.—Buoys.—In the middle of the passage, between Redhorse Rock light and the northeast extreme of Howe Island, (*Lat. 44° 18′ N., Long. 76° 12′ W.*) is placed a red and black horizontally-striped buoy, marking Anchor Shoal. A black spar buoy is also moored 380 yards (317m0) 024° from Redhorse Rock light.

Sheriff Point.—From the entrance to Gananoque River, the Canadian shore, 100 feet (30m5), high, trends in a general southwesterly direction, 2 miles to a narrow projection named Sherriff Point, close to which is the small **Point Island** with a summer cottage upon it, distant 250 yards (228m6) from Redhorse Rock light, the channel to Gananoque passing between them.

Chart 1458.

Buoys.—Two red spherical buoys are placed on the northwest side of the channel near Point Island, the track passing between them and Redhorse Rock light.

Ormiston Island.—Buoy.—Southwestward half a mile from Gananoque River is Ormiston Island, 200 yards (182^{m}9) southeast of which is moored a black spar buoy, on the north side of a 5-foot (1^{m}5) rock. Vessels pass northward of this buoy.

Pike and **Cherry Islands** lie a quarter of a mile westward of Ormiston Island with foul ground between.

Shoal.—A shoal patch, with 7 feet (2^{m}1) of water over it, is situated 200 yards (182^{m}9) southward of Pike Island.

Spectacles Rocks, two in number, bushy and 5 feet (1^{m}5) high, lie three-quarters of a mile northeast of Sheriff point.

Light.—Spectacles Shoal.—Erected on this shoal is a red skelton tower which, from a height of 28 feet (8^{m}5), exhibits a *flashing white* light. The channel is between this light and Spectacles Rocks.

Buoys.—A red spar buoy is moored in 18 feet (5^{m}5) of water, about 550 feet (167^{m}6), 022° from Spectacles Shoal light. A black spar buoy moored in the same depth, about 1,000 feet (304^{m}8) 050° from Spectacles Shoal light, marks the shoal which extends 250 yards (228^{m}6) north of Spectacles Rocks; a second black spar buoy is moored about 400 feet (121^{m}9) south of the above black spar buoy.

Charts 1458, 1477.

Howe Island, attaining a height of 90 feet (27^{m}4), 8½ miles long, northeast and southwest is separated from the Canadian shore by a passage known as Bateau or North Channel, narrowing at mid-length of the island to 250 yards (228^{m}6), where there is placed, on the south side of the passage, a black spar buoy, marking the channel. A 6-foot (1^{m}8) shoal is situated about 700 feet (213^{m}4) westward of the black spar buoy. **Cassidy Shoal,** near the west end, is marked by a black spar buoy. Westward, 2¾ miles from the northeast extremity of Howe Island, is the entrance to a shallow marshy indentation 2¾ miles in length named **Johnson Bay.**

Bateau or **North Channel** leads for the full length of Howe Island, between the latter and the main Canadian shore.

Light.—A *fixed red* light is exhibited, at a height of 30 feet (9^{m}1), from a mast with a diamond-shaped daymark, situated about 2 miles eastward of the southwestern extremity of Howe Island.

Ferry.—A ferry runs from the mainland to Howe Island, about 2 miles northeastward of Spit Head.

Grog *(Lat. 44° 18′ N. Long. 76° 15′ W.)* is a small island off the mouth of Johnson Bay and on the north edge of Bateau Channel.

Shoal.—A shoal, with a depth of 6 feet (1^{m}8) over it, lies in the middle of the channel 6,700 feet (2,042^{m}2) below Grass Island.

The extreme western point of Howe Island long and narrow, known as **Spit Head,** has shoal water extending one mile southwestward from it, with depths of 2 feet (0^{m}6) being found three-quarters of a mile from the point.

Charts 1477, 1458.

Buoy.—On the southeast side of Howe Island, $1\frac{3}{4}$ miles, 199° from Burnt Island light, is moored a spherical buoy with red and black horizontal bands, on the northwestern side of a 13-foot (4m0) shoal and about 4,300 feet (1,310m6) 135°, from the latter, a black spar is moored on a patch with 10 feet (3m0) least water over it.

Cold Bath Shoal.—Light-buoy.—This shoal, rather nearer the southwest end of Howe Island than Oak Point of Wolfe Island, has a depth of 9 feet (2m7) on it, and is marked by a red cylindrical light-buoy, 46T, showing a *flashing red* light, distant $3\frac{1}{2}$ miles eastward from Knapp Point light (*See* page 153).

Gates Island, close to the Canadian shore northwest of Howe Island, is 5 miles northeastward of **Point Frederick,** the east entrance point of Kingston Harbour, the latter surmounted by a martello tower with red roof, known as **Fort Frederick.** The shore between Sheriff Point and Gates Island attains an elevation of 140 feet (42m7), the portion between the latter and Kingston rises to a height of 105 feet (32m0).

Milton Island is situated $3\frac{3}{4}$ miles eastward from Point Frederick and three-quarters of a mile northward of Knapp Point lighthouse on Wolfe Island. Close northeastward of Milton Island is **Milton Point.**

The Spectacles, in two parts, bushy and about 2 feet (0m6) high, lie a third of a mile southeast of Milton Island.

Light-buoy.—A red light-buoy, showing a *flashing red* light, is moored close southward of The Spectacles.

Cedar Island, wooded, and separated from the main shore by a channel used by vessels of light draught, lies three-quarters of a mile southeast of Point Frederick, and has an old martello tower erected on it. **Point Henry,** 100 feet (30m5) high, with smooth grassy slopes, and surmounted by Fort Henry, is close east of Point Frederick, the inlet east of it being called **Deadman Bay,** and that west of it, **Navy Bay.** (For description of Kingston, *see* page 159).

Light.—A *flashing red* light is shown, at an elevation of 25 feet (7m6), from a red, steel, skeleton structure, surmounted by a red lantern, on the southwest extremity of Cedar Island, about 500 feet (152m4) from the martello tower. The light is unwatched.

An experimental range light has been temporarily established near the above light.

Wolfe Island, in Canadian waters, has a total length of 18 miles, its northeastern and narrow portion, rising to a height of 60 feet (18m3). As stated on page 149, its northeast extremity, known as Quebec Head, is separated from Blanket Shoals of Francis and Arabella Islands by Wolfe Island Cut, 300 feet (91m4) wide and 16 feet (4m9) in depth, connecting the Canadian and American channels.

Wharf.—At Quebec Head is a wharf, with a face 60 feet (18m3) in length.

Light.—On **Quebec Head** *(Lat. 44° 14′ N. Long. 76° 11′ W.)* is erected a white square building, which, at a height of 37 feet (11m3), exhibits a *fixed white* light.

Chart 1477, 1458.

The north coast of Wolfe Island, from this cut to Knapp Point distant $10\frac{1}{2}$ miles, (see below), is broken by several shallow bays, the largest, running in $1\frac{3}{4}$ miles with **Holliday Point** on its western side, being nearly midway. From Holliday Point, a shallow reef extends northeastward for a quarter of a mile. Between Quebec, and Holliday Points, the outer coast is steep-to, and, in the clean bay between them, vessels will find shelter in 3 fathoms (5^m5) in southerly gales.

Buoy.—A black spar buoy is moored off the end of the reef extending from Holliday Point.

Oak Point, rather nearer Holliday than Knapp Point, is rendered conspicuous by the clump of trees on its extremity, in contrast with the bare neck behind it. The point has a patch with 12 feet (3^m7) of water on it, lying 400 yards (365^m8) northeast of it, and another, with 15 feet (4^m6) of water, is situated three-quarters of a mile west of that point. The outer end of a bank with a depth of 9 feet (2^m7) also lies three-quarters of a mile east from Oak Point. Cold Bath Shoal and buoy, described on page 152, lie off this point.

Knapp Point is situated $10\frac{1}{2}$ miles westward from Quebec Head, and from the bays between, flats with less than 14 feet (4^m3) of water on them, extend a little beyond the line joining those points. The point, and also Brophy Point, lying a quarter of a mile east of it, are densely wooded, the trees coming close down to the lighthouse. The northwest side of Knapp Point is steep-to. Knapp and Brophy Points are extremities of what is known as **Abraham Head, MacDonnell Bay,** quite shoal, lies on its eastern side and **Brown Bay,** deeper, on its western side.

Light.—On Knapp Point is erected a white square tower, which, at a height of 28 feet (8^m5), shows a *flashing white* light.

Bayfield Shoal.—Buoy.—An isolated rock patch, with depth of 8 feet (2^m4), and marked by a black and red horizontally-striped spar buoy, lies one mile westward of Knapp Point lighthouse. The buoy is fitted with a radar reflector.

Garden Island, three-quarters of a mile long northeast and southwest, and one-third of a mile in breadth, lies $1\frac{1}{2}$ miles southward of Kingston Harbour and a third of a mile from Wolfe Island. The island is low, with a small settlement on its northeast portion. The southwest end of Garden Island is wooded to the water.

Ferguson Point is three-quarters of a mile east of Garden Island, and 3 miles southwest of Knapp Point lighthouse, and between the latter and Ferguson Point, the low coast dotted with trees, takes the form of a broad bight, named Brown Bay, with depths under 12 feet (3^m7). **Dawson Point** is a mile and a half eastward of Ferguson Point. The flats connecting Garden Island, Simcoe Island, and the Wolfe Island shore, have 3- and 6-foot (0^m9 to 1^m8) patches midway between the former islands. The shallow bight enclosed by Garden Island and Ferguson Point is known as **Barrett Bay.** On its south side is **Wolfe Island Village,** with about 300 inhabitants.

Chart 1477.

Wharves.—At Wolfe Island Village is Hogan's coal dock with a face 90 feet (27^m4) in length; a channel 1,600 feet (487^m7) long and 40 feet (12^m2) wide, leading to the wharf, has been dredged to a depth of 9 feet (2^m7). A turning basin, in front of the dock, 140 feet (42^m7) long and 100 feet (30^m5) wide,

Chart 1477.

was dredged to the same depth. There is a Government wharf, which is 194 feet (59m1) long and 87 feet (26m5) wide. The depth at the outer end is 8½ feet (2m5). A channel 1,000 feet (304m8) long and 150 feet (45m7) wide, leading to the ferry wharf, has been dredged to a depth of 8 feet (2m4). Spoor's wharf, near the west end of Wolfe Island and facing Bateau Channel, is 100 feet (30m5) long with an ell end 60 feet (18m3) in length. The area in front of the dock and extending to deep water, with small basins at each side of the dock, has been dredged to a depth of 6 feet (1m8).

Ferry.—A ferry, for passengers and autos, plies between Kingston, Simcoe Island, Garden Island and Wolfe Island Village on an hourly schedule.

Buoys.—Two black light-buoys, showing *flashing green* lights, mark the approach channel to the village of Wolfe Island, and a black and a red spar buoy mark the channel entrance to the ferry wharf.

Bass Rocks, above water, lie 300 yards (274m3) north of Wolfe Island Village ferry wharf.

The eastern corner of Barrett Bay is connected to Bayfield Bay, on the southeast side of Wolfe Island, by a narrow canal 2½ miles long formerly used by the ferry steamer plying between Kingston and Cape Vincent, but now almost closed.

Simcoe Island, a little over 3½ miles in length northeast and southwest and a mile in greatest width, with scattered trees, and about 40 feet (12m2) high, is situated at the northwest extremity of Wolfe Island, being separated therefrom, by a passage a quarter of a mile wide, called **Bateau Channel,** suitable only for small craft, on account of the shoals stretching from the northeast end of Simcoe Island to Garden Island (*Lat 44° 12′ N., Long. 76° 28′ W.*) and Ferguson Point. Simcoe Island wharf on the south side of the island, about half a mile from its southeastern point, has a face 60 feet (18m3) in length, with a depth of 5½ feet (1m6) alongside.

Buoys.—A black spar buoy and a red spar buoy are moored eastward of Simcoe Island.

Light.—Ninemile Point.—This name is given to the southwest extremity of Simcoe Island, on which is erected a white circular stone tower, exhibiting at a height of 45 feet (13m7) a *group flashing white* light.

Fog Signal.—In thick, or foggy weather, a diaphone, operated by compressed air gives *one blast* of *3 seconds* duration *every 30 seconds.*

From Ninemile Point, shoal water extends a quarter of a mile. From the northwest side of Simcoe Island, a mile from the lighthouse, a flat extends a third of a mile, and, from the northern portion of the island, a bank extends half a mile, leaving a narrow channel, with depth of 14 feet (4m3) between it and Snake Island Bank.

Snake Island, small, and with a few trees on it, lies upon the northwest edge of a bank two-thirds of a mile in diameter. The remains of the old pier, on which Snake Island light stood, are to be seen bearing 300°, distant 1,000 yards (914m4) from Fourmile Point. The island bears 308°, and is a mile distant from Fourmile Point.

Chart 1477.

Buoys.—A black light-buoy, showing a *flashing white* light, is moored on the northwest extremity of Snake Island Bank, 4,300 feet (1,310^{m}6) south of Portsmouth front leading light. A red spar buoy is moored on the same bank, 300 feet (91^{m}4) southeastward of the old lighthouse pier located half a mile northwestward of Fourmile Point.

Middle Ground, with 12 feet (3^{m}7) of water over it, lies between Snake Island Bank and Melville Shoal.

Light-and-bell-buoy.—On the west side of Middle Ground is moored a black light-and-bell-buoy, 69T, showing a *flashing white* light, bearing 358°, distant 1¾ miles from Ninemile Point light.

Clearing mark.—Pigeon Island light, bearing 176°, and just open westward of Ninemile Point light, leads westward of Middle Ground Shoal.

Melville Shoal *(Lat. 44° 11′ N., Long. 76° 35′ W.)*, with one foot (0^{m}3) of water over it, lies midway between Simcoe Island and the northeast extremity of Amherst Island. Under the depth of 18 feet (5^{m}5), it extends 1½ miles northeast and southwest, its breadth being a third of a mile.

Buoy.—The southeastern edge of this shoal is marked by a red spar buoy, bearing 339°, distant 1·9 miles from Ninemile Point light.

Portsmouth range lights in line, bearing 018½°, lead between Melville Shoal and the Middle Ground (*see* above).

Horseshoe Island.—The southwest side of Wolfe Island has four prominent projections. Off the northwestern point, known as **Staley Point,** distant 400 yards (365^{m}8), lies Horseshoe Island, half a mile in diameter, 10 feet (3^{m}0) high, and partly wooded, and at the southwest entrance to Bateau Channel, before alluded to. Shoal water extends half a mile from the southwest point of Horseshoe Island.

Bell Point, low with scattered trees, is one mile south of Horseshoe Island; the head of **Grimshaw Bay,** between them, being shallow. Shoal water extends a third of a mile from Bell Point.

Long Point, its shape indicated by its name, projects southwestward 1⅔ miles from the same side of Wolfe Island, having between it and Bell Point, a capacious indentation, named **Reed Bay,** running in nearly 3 miles, but shallow at the head as well as on its northwest and southeast sides. Long Point is low and sparsely wooded. A dangerous bank extends over three-quarters of a mile west from Long Point. At half a mile from the point, the depth is but 5 feet (1^{m}5). A red spar buoy is moored at the end of the shoaler part of this bank.

Bear Point (*see* page 157), the southern extremity of Wolfe Island, and the southeastern of the four projections above mentioned, encloses, together with Long Point, the broad, and fairly clean bight known as **Big Sandy Bay,** 1¾ miles wide, the eastern side of which is composed of sand-hills, 20 to 30 feet (6^{m}1 to 9^{m}1) high.

Buoy.—A red spar buoy is moored off the southwest extreme of Bear Point.

Bayfield Bay.—From Quebec Head, the coast of Wolfe Island trends southeasterly, a third of a mile to Beauvais Point with a cottage and a boathouse upon it. Thence, the coast turns abruptly, and runs, with an outward curve, 8 miles to **Bayfield Island** in the mouth of a shallow bight 1¼ miles in diameter, named Bayfield Bay, from the head of which, the narrow canal, mentioned above, formerly led to Barrett Bay on the opposite coast of the island.

Chart 1477.

Light.—At **Banford Point,** on the south side of Wolfe Island, about $3\frac{1}{2}$ miles west of Beauvais Point, a *flashing red* light is shown, at an elevation of 15 feet (4^m6), from a red steel structure.

Light-buoy.—A red light-buoy, 44 T, showing a *flashing red* light, is moored on the west side of the channel off Bayfield Island.

Wharf.—At **Alexandria Point** on Wolfe Island, situated about $3\frac{1}{2}$ miles southwestward of Carpenter Point, is a Government wharf, with a pierhead 60 feet (18^m3) in width and a depth 11 feet (3^m4) along the face.

Light.—An *occulting red* light is exhibited, at an elevation of 30 feet (9^m1), from the western side of Alexandria Point wharf.

Ferry.—A ferry, for passengers, and autos, operates between Alexandria Point on the south side of Wolfe Island and Cape Vincent, N.Y. A good automobile road connects Alexandria Point and Wolfe Island Village.

Cables.—Submarine cables cross the channel between Alexandria Point and Cape Vincent.

Carleton Island *(Lat. 44° 11′ N., Long. 76° 17′ W.),* 60 feet (18^m3) in height, $2\frac{1}{3}$ miles long east and west, and one mile broad, is situated southeast of Bayfield Island, $9\frac{3}{4}$ miles westward from Clayton. By the passage 800 feet (243^m8) wide, south of the island, defined by two black spar buoys, a vessel can carry 12 feet (3^m7), but, the main channel north of the islands is recommended to vessels drawing over 10 feet (3^m0). A bank extends three-quarters of a mile from the eastern extremity of the island.

Buoy.—A black spar buoy, 27 A, is moored 1·15 miles, 031°, from Carleton Island light.

Light.—On the northwest point of Carleton Island, is erected a white square, pyramidal, skeleton tower, from which is exhibited at a height of 107 feet (32^m6), a *flashing white* light. It is obscured between 230° through west, to 000°. The light is unwatched.

From Bayfield Island and **Carpenter Point** southwest of it, shoal water extends half a mile, to avoid which, vessels should pass close to Carleton Island lighthouse.

Hinckley Point.—From Bayfield Bay, the southeast coast of Wolfe Island trends southwest 4 miles, and, then, easterly one mile to a low projection with a villa residence upon it, named Hinckley Point, thus, forming on the north side of the latter, a shallow indentation called **Button Bay.** The best water is on the southeast side of this bay, where there is excellent shelter from the southwest gales.

Wreck.—It has been reported that a wreck, with less than 6 feet (1^m8) of water over it, lies in Button Bay, about 2,200 feet (670^m6) west-northwestward of the extremity of the sharp point close westward of Hinckley Point.

Hinckley Flats Shoal, with depths ranging from one to 12 feet (0^m3 to 3^m7), extends from the point of that name northeasterly nearly $2\frac{1}{2}$ miles.

Light-buoy.—A red light-buoy, No. 22, showing a *flashing red* light, is moored on the channel edge of the outer portion of this rocky spit, one mile southwest of Carleton Island lighthouse. This buoy also bears 026°, and is distant 5·3 miles, from Tibbetts Point light (*see* page 159) and a line joining them leads along the southeast edge of this extensive spit.

Chart 1477.

Leading lights.—Near the end of **Irvine Point** are located two masts, exhibiting at heights of 28 and 60 feet (8^m5 to 18^m3), respectively, *fixed white* lights.

These two lights in line, bearing 014°, lead clear of Hinckley Flats Shoal. The masts are surmounted by white diamond-shaped daymarks.

Light.—On the south side of Wolfe Island, about $1\frac{3}{4}$ miles southwestward of Alexandria Point, a *flashing white* light is shown, at an elevation of 45 feet (13^m7), from a pole.

Bear Point, already referred to on page 155, is the southern extremity of Wolfe Island, and distant 5 miles southwestward from Hinckley Point, the shore between being fairly steep-to. Bear Point is composed of rock, and 10 feet (3^m0) high. The southeast shore for $1\frac{3}{4}$ miles northeastward from the extremity of the point is of a dark cliffy character. At the above distance, it is succeeded by a low bay, between which, and the peninsula of Hinckley Point, the shore again rises in an earth cliff 50 feet (15^m2) high.

Shoal.—A third of a mile southward from Bear Point is an isolated shoal, with 9 feet (2^m7) of water on it; it is marked by a red spar buoy moored on the southwest extreme. (For southwest coast of Wolfe Island, *see* page 155).

Feather Bed Shoal.—From Mellen Bay (*see* page 148) the coast of the State of New York trends westerly, $2\frac{1}{3}$ miles, and, then, a little more southerly 3 miles to Cape Vincent. From this broad outward bend of the coast, a bank extends one mile, its western portion being just awash, and termed Feather Bed Shoal.

Light-buoy.—The western edge of this shoal is marked by a black conical light-buoy, No. 29, exhibiting a *flashing white* light.

United States chart 17. Chart 1477.

Cape Vincent Harbour *(44° 08′ N., Long. 76° 20′ W.),* is situated about $2\frac{1}{2}$ miles below Lake Ontario, has a wharf frontage of about $1\frac{1}{2}$ miles. There is deep water to within a short distance of the wharves, but these will not accommodate vessels drawing more than 10 to 12 feet (3^m0 to 3^m7) of water. A breakwater, affording shelter and mooring for vessels, is built parallel to and 500 feet (152^m4) from the railroad wharf. The length of the main breakwater is 1,331 feet (405^m7) and of the shore return 50 feet (15^m2). The breakwater is supplied with mooring posts and vessels can lie on both sides of it. It affords a convenient mooring place for downbound vessels reaching the river at night or in thick weather, at which times navigation of the upper river is dangerous, and also for upbound vessels arriving at the head of the river when weather conditions make it unsafe to venture into the open lake. In 1955, there was a least depth of 15 feet (4^m6) in the approach to and around the breakwater over a width of 100 feet (30^m5) at the upper end widening to 250 feet (76^m2) at the lower end on the mainland side, and depths of 24·6 to 26 feet (7^m4 to 7^m9) along the river side. A ferry runs daily from Kingston to Cape Vincent.

Lights.—Breakwater, east end.—On this end of Cape Vincent breakwater is erected, a white, square, tower exhibiting, at a height of 28 feet (8^m5), a *fixed red* light.

Breakwater, west end.—A similar tower, also showing a *fixed red* light, is erected on the west end of the breakwater.

United States chart 17. Chart 1477.

Submarine cable.—A submarine cable extends from the Coast Guard lighthouse depot, in a northeasterly direction to the western end of the breakwater.

Harbour Regulations:

(1) The term "harbour", when used in these regulations, applies to all that portion of the St. Lawrence River lying within the following boundaries: Beginning at a point on the harbour face of the breakwater at its easterly end and extending in a straight line along the harbour face of the main part of the breakwater and in extension thereof westerly approximately 2,400 feet (731^{m}5); thence at right angles to the above-described line southerly to the northeast corner of the "L" dock at the foot of Market Street, approximately 300 feet (91^{m}4); thence easterly along the dock face at shoreline to a point in a line at right angles to the breakwater at its easterly end; and thence along this last-described right angle line to the point of beginning.

(3) Vessels shall not exceed a speed of 8 miles per hour in the harbour.

(4) Vessels shall observe the following rules in mooring to the breakwater:

United States chart 17.

The first self-propelled vessel stopping at the harbour for shelter will proceed to the upstream end of the breakwater and moor along either side of it. All similar vessels entering later will place themselves in a compact position close to those preceding them. Passenger vessels will, in general, have preference as to location of moorage. Sailing craft will so locate themselves that they will not lie in the way of other vessels entering the harbour. All vessels of every description will place themselves so as not to interfere with any work of reconstruction or repair that may be in progress at the time.

(5) The use of chains in making fast to the breakwater is prohibited. Lines must be attached to the snubbing posts only, and outboard anchors taken in.

(6) Vessels with other craft in tow will, if practicable, at once moor them compactly along the breakwater, either taking in the tow lines or placing the slack in them upon the breakwater in such a manner as not to interfere with other vessels. If necessary to moor alongside other vessels moored to the breakwater, the tow lines shall be taken in or disposed of in such a manner as not to interfere with the departure of vessels moored between them and the breakwater.

(7) Vessels of every description mooring to the breakwater, must place suitable fenders between themselves and the breakwater to protect the timber walings on the breakwater from damage.

(8) The unloading of freight of any class upon the breakwater is expressly prohibited, except in accordance with special permission.

(9) Each and every vessel made fast to the breakwater, or anchored in the harbour without a line made fast to the shore or shore dock, must have at least one experienced person upon it during the entire time said vessel is thus moored in the harbour.

Chart 1477.

Tibbetts Point *(Lat. 44° 06′ N. Long. 76° 22′ W.)* on the shore of Lake Ontario, is situated 2½ miles southwest from Cape Vincent Harbour, the park-like coast between, 60 feet (18^{m}3) high, being nearly straight, and steep-to. The point is composed of dark brown rock, and its tall lighthouse, when the sun is on it, is conspicuous from the lake. Reefs extend off about 1,000 feet (304^{m}8) around the point.

Chart 1447.

Tibbetts Point and Bear Point of Wolfe Island may be considered as the southeast and northwest entrance points of South, or Main Channel of the St. Lawrence River.

Light.—On the western extremity of Tibbetts Point is erected a white, round, tower 59 feet (18^{m}0) high, which, at a height of 69 feet (21^{m}0), exhibits an *occulting white* light.

Fog signal.—At Tibbetts Point lighthouse, a diaphone, sounds a blast of *three seconds every 30 seconds.*

Radiobeacon.—There is a radiobeacon at Tibbetts Point.

Shoal.—A bank, with 17 feet (5^{m}2) of water on it, lies with its north end bearing 243°, 0·85 mile from Tibbetts Point light.

Light-buoy.—A black light-buoy, No. 31, showing a *flashing white* light, is moored on the western side of the above shoal.

Chart 1459.

Kingston, at the division of the St. Lawrence River from Lake Ontario, and standing upon the west entrance point of Cataraqui River at a height of 60 feet (18^{m}3), had, in 1951, a population of 33,459. Its distance, by the natural waters and canals, from the lower entrance of Lachine Canal, Montreal, is about 182 (158 nautical) miles. From abreast Quebec customs house, it is distant nearly 344 (299 nautical) miles. By a branch of the Canadian National Railways 2¼ miles in length, Kingston has connection with the main line. It is also the terminus of the Bay of Quinte Branch of the Canadian National Railways, and Kingston and Pembroke Branch of the Canadian Pacific Railway. Its distance by rail from Montreal is 175½ miles, and from Toronto 163¼ miles. The city is the seat of Queen's University. The Royal Military College is situated on Point Frederick. The most conspicuous objects in Kingston are the dome of the city hall, with its illuminated clock, which serves as a lighthouse, the tall square tower of the St. Mary's Roman Catholic Cathedral, the dome of St. George's Anglican Cathedral, and several other church spires, the dome of the penitentiary, the Ontario Hospital, a grain elevator, and several martello towers. A depth of 16½ feet (5^{m}0) can be carried into Kingston Harbour, on the line of the leading lights.

A bridge, called **La Salle causeway,** crosses Kingston Harbour, half a mile north of Point Frederick, and, through which, by means of a lift 150 feet (45^{m}7) wide, vessels drawing 15½ feet (4^{m}7) can proceed to the Canadian Pacific Railway wharf, or proceed to Ottawa and Perth by the Rideau Canal system if drawing not more than 5 feet (1^{m}5). (*See* page xl). The causeway is closed to navigation during the following hours.—12 noon to 1:30 P.M.; 5.30 P.M. to 7:30 P.M.; 2 A.M. to 3:30 A.M.

Inner harbour.—An irregular shaped area, lying just north of La Salle causeway and extending across the river, has been dredged to varying depths. Eastward of the opening in the causeway, an area, has a depth of 9 feet (2^{m}7). Vessels dock on the north side of the bridge here, where sheltered by that structure, there is good dockage for a length of 600 feet (182^{m}9).

Anglin Bay.—Westward from the opening, there is a channel with a least depth of 18 feet (5^{m}5), leading to the Canadian Pacific Railway dock in Anglin Bay, with the same depth at the end of this dock. There is a depth of

Chart 1459

14½ feet (4m4) along the face of Saward's coal dock. The slip, on the west side of the bay has been dredged to 12 feet (3m7), and the channel to Davis dry dock to 10 feet (3m0).

Buoy.—A red spar buoy marks the northern side of this dredged area.

Dredged Channel.—Buoyage.—The dredged channel, from the southwest extremity of Carruthers Shoal to La Salle Causeway, is marked by six red spar buoys and two black spar buoys, the positions of which can be best seen on the chart.

A ferry plies daily to Wolfe Island.

Period of navigation.—The average date of the opening of navigation is April 8; that of the closing December 18.

Radio station.—A radio station, open during the season of navigation, is established at Kingston, on the heights above Fort Henry. Reports respecting dangers to navigation on Lake Ontario and the St. Lawrence River, above Lake St. Francis, and weather reports are transmitted at 10:50 a.m. and p.m.

Dry docks.—The Government dry dock is situated 600 yards (548m6) south of the city hall. Its length is 352½ feet (107m4) which may be increased by 23½ feet (7m1) if the floating caisson is placed in the outer stop, breadth of entrance 55 feet (16m5) and depth on sill 13¾ feet (4m3) at the extreme low water of 1895.

A private dry dock, suitable only for small vessels, is situated above the bridge and known as Davis dry dock. It is 213 feet (64m9) long, 43 feet (13m1) wide, with a depth of 9 feet (2m7) on the sill.

Rideau Canal.—The Ottawa and St. Lawrence Rivers are connected, at Kingston, by the Rideau Canal, 123½ miles in length. (For a description of locks, depths, and other details, see page xlii of this volume.)

Lights.—Kingston city hall.—The illuminated clock of the city hall serves as a *fixed white* light, elevated 107 feet (32m6).

Barriefield Common range.—The front red tripod, with white oval beacon on top, is erected 370 feet (112m8) east of La Salle causeway, and, at a height of 48 feet (14m6), exhibits a *fixed green* light.

The rear similar structure stands 500 yards, (457m2), 037°, from the front beacon, and at a height of 75 feet (22m9), exhibits a similar light. The white oval beacons or targets, when in one are also in line with the southeast edge of St. Mark Anglican Church square tower in Barriefield. These lantern lights show over a small arc on each side of the alignment, which leads northwest of Myles, Carruthers, and Point Frederick Shoals, with a depth of 16½ feet (5m0).

Wharves.—Depths.—The Government wharf *(Lat. 44° 13′ N., Long. 76° 31′ W.)* at Portsmouth, with 15 feet (4m6) of water at the outer end, extends 685 feet (208m8) from the west side of the shallow bay immediately west of the penitentiary ground. On the eastern side of this bay is a wharf, 315 feet (96m0) in length, with a depth of 16 feet (4m9) alongside. From the landing of the penitentiary just west of Kingston, the wharves are almost continuous for 2 miles to the bridge, having depths ranging from 12 to 20 feet (3m7 to 6m1), and a total frontage of 4,000 feet (1,219m2). Half a mile below the penitentiary is the Public Utilities dock, with 14 feet (4m3) of water alongside. The outer part of the dock is in ruins. Queen's University dock lies just above **MacDonald Park.**

Chart 1459.

The Canadian Shipbuilding and Engineering Company dock, with 20 feet (6m1) of water along the outer end, is located two-thirds of a mile southwest of La Salle Causeway. The Canadian Locomotive Company dock, north of the last-mentioned, has 19 feet (5m8) of water along the outer face and the berth 80 feet (24m4) wide along the north side has a depth of 9½ feet (2m8).

Next in order is Swifts dock, with 13 feet (4m0) of water at the outer end, and 10 feet (3m0) on the south side. The berth on the south side of the Rockport Navigation Company wharf, 100 feet (30m5) long and 50 feet (15m2) wide, has a depth of 11 feet (3m4). The berth on the north side has a depth of 13 feet (4m0). The R. C. Crawford dock has a depth of 12 feet (3m7) at the outer end. The wharf of Canada Steamships Lines Ltd. is located 800 feet (243m8) below the causeway; it has a depth of 18 feet (5m5) alongside, excepting the inner 40 feet (12m2) of the southern slip, which has been dredged to 11½ feet (3m5). On the north side of La Salle Causeway, at the east end, is a Government wharf with a frontage of 454 feet (138m4). Along the face is a depth of 9 to 11 feet (2m7 to 3m4) with 9 to 10 feet (2m7 to 3m0) in the approach.

Carruthers and Point Frederick Shoals.—A bank, half a mile long northeast and southwest, extends from abreast the Government dry dock toward the shore a little north of Point Frederick, and a rocky ridge, under 6 feet (1m8), makes off 400 feet (121m9) from the point. The southwestern and shoaler portion with 8 feet (2m4) of water on it, is named Carruthers, and the northeastern part with 11 feet (3m4) is known as Point Frederick Shoal. Between Carruthers Shoal and Point Frederick, there is a passage with depth of 10 feet (3m0), known as the **Eastern Channel,** but the more direct and slightly deeper channel, with 16½ feet (5m0) of water, is between the bank and the city, the line of Barriefield Common range lights leading just clear of the bank extending from the city.

Buoys.—A red spar marks the southwest extreme of Point Frederick Shoal; the southeast side of Carruthers Shoal is marked by a black spar buoy and the southwest extreme by a red spar buoy.

Intake pipes.—Two buoys mark the location of the city's intake pipe. The outer buoy, a red spar, lies in the line of the east side of West Street, 2,550 feet (777m2) south-southeastward from Waterworks wharf; the inner buoy, a red steel conical, showing a *flashing red* light, lies about a quarter of a mile from the same wharf.

A red light-buoy, showing a *flashing red* light, marks the outer end of a second intake pipe, which extends 1,000 feet (304m8), 172°, from the southwest corner of the Public Utilities wharf.

Magnetic disturbance.—The normal variation of the compass (1940) for the shores adjacent to Kingston Harbour was about 12 degrees *west,* but, along the front of the city, it is not less than 18 degrees in the same direction. At the Government dry dock, it is as much as 30 degrees *west,* and abreast the Penitentiary it is 18 degrees *east.* A short distance west of Rockwood Asylum, the variation is again normal. Midway between Point Frederick and Garden Island, the amount of *westerly* variation is 20 degrees. At Simcoe Island, it is normal.

Chart 1459.

The effect to the mariner, is, that the bearings, if magnetic, of the line of the Kingston leading lights, and those of the buoys in the vicinity, may differ from those actually observed by him. Moreover, extra caution is necessary in approaching or leaving Kingston in thick weather on a course.

Cataraqui Bay.—From Kingston, the shore, rising to a height of about 60 feet (18^{m}3), trends westerly 2$\frac{1}{3}$ miles to **Samson Point** on the east side of Cataraqui Bay, which runs in three-quarters of a mile, with depths under 9 feet (2^{m}7).

Elevators.—The elevator of the Kingston Elevator Company Limited is located in Cataraqui Bay. It is a long narrow structure having a capacity of 2,500,000 bushels, with unloading facilities on one side and loading-out facilities on the other side. The slip for unloading the upper lake boats is on the downstream side of the elevator and is 700 feet (213^{m}4) long, 300 feet (91^{m}4) wide, and dredged to 23·5 feet (7^{m}1). The slip for loading the canal-size boats is 600 feet (182^{m}9) long, 250 feet (76^{m}2) wide, and dredged to 17 feet (5^{m}2). Unloading facilities consist of two travelling marine towers, by means of which all the holds may be reached without moving the ship. Shipments may also be made by rail as the Canadian National Railways have built a spur line to the elevator.

Buoys.—The turning basin, 1,020 feet (310^{m}9) long and 380 feet (115^{m}8) wide along the west side and off the south end of the elevator pier, is marked by three black spar buoys.

Breakwater.—For the protection of the berths at the elevators, a breakwater 2,600 feet (792^{m}5) long has been built from Carruthers Point. The outer end is 2,610 feet (795^{m}5), 073°, from the front light of Portsmouth leading lights.

Light-buoy.—A black cylindrical light-buoy, No. 65 T, showing a *flashing green* light, is moored off the east extremity of the breakwater.

Lights.—Portsmouth leading lights, at Cataraqui Bay, about three miles west of Kingston, lead in from Lake Ontario to the north channel approaching Kingston and the head of St. Lawrence River. The front light, on a white square wooden structure at a height of 32 feet (9^{m}8), on the east extremity of **Carruthers Point** (the westerly entrance point of Cataraqui Bay), is *fixed green*, visible in the line of range and also down the channel toward Kingston. The rear light, on a white, square steel skeleton tower at a height of 101 feet (30^{m}8), on the north shore of the bay 3,800 feet (1,158^{m}2), 018½°, from the front light, is *fixed green*. Vessels approaching from the lake may head for either Ninemile Point or Fourmile Point light until the range comes on; the range leads between Melville Shoal and the middleground into the north channel, with nowhere less than 4 fathoms (7^{m}3). When Snake Island is abeam, the range may be left, and a course shaped to lead north of Penitentiary Shoal. (*See* page 163).

Intake pipe.—From the south extreme of Carruthers Point two intake pipes extend south 1,960 feet (597^{m}3) into the lake; the seaward ends of the pipes are marked by cribs. A large sign marks the shore end of the pipe and mariners are warned not to anchor in its vicinity.

Light-buoy.—The outer ends of the pipes are indicated by a red light-buoy, showing a *flashing red* light, and moored in 85 feet (25^{m}9) of water, about 3,200 feet (975^{m}4), 196°, from Portsmouth front leading light.

Chart 1459.

Myles Shoal, with 8 feet (2m4) of water on it, is an isolated patch, lying nearly in the middle of the channel, and a mile northwestward from Garden Island.

Buoy.—A spar buoy, painted with red and black horizontal bands, is moored on Myles Shoal, and bears 221°, distant 1¼ miles from Point Frederick.

Penitentiary Shoal, with 10 feet (3m0) of water on it, lies a mile southeastward of Samson Point, and 1¼ miles westward of Myles Shoal.

Light-buoy.—A cylindrical light-buoy, 61 T, painted with red and black horizontal bands, and exhibiting a *flashing white* light, is moored on Penitentiary Shoal.

Charts 1458, 1477.

Directions, Alexandria Bay to Kingston.—(For directions Prescott to Alexandria Bay *see* page 140). Proceeding upstream from Alexandria Bay *(Lat. 44° 20′ N., Long. 75° 55′ W.)*, a vessel passes south of Pullman Shoal light and steers 219°, which course leads about half a cable northwest of Comfort Island light. When a cable past the light, steer 235° for 2·4 miles, or until one cable below the bridge, when alter course and steer 231° for 2·6 miles, passing between Granite State Shoal light and Rock Island light. When 2 cables above Rock Island steer 239° for 2½ miles heading on Chapman Shoal light, and passing red spar buoy, 18, close to starboard and light-buoy 25 to port. When abreast the small rocks east of North Colborne Island, steer 228° for 6 cables, when alter course and steer 241° until abreast Bartlett Point light. Now steer 246°, until the red light buoy at the southeast end of Wolfe Island dredged cut comes in line with Quebec Head light, when haul up for the former, steering 310°, and leaving it to starboard, pass between the buoys marking the cut, until abreast the light.

Round the light on Quebec Head at a cable, and steer 270° for 7·7 miles for Cold Bath Shoal light-buoy, 46 T. Passing south of this buoy, steer 265° with Knapp Point light a little on the port bow. Pass a quarter of a mile north of this lighthouse, and keep Cold Bath Shoal light-buoy well open north of Knapp Point light, which leads north of Bayfield Shoal red and black striped buoy. Oak Point in line with Knapp Point lighthouse, bearing 084°, also leads north of Bayfield Shoal.

Thence, pass a quarter of a mile south of Cedar Island, and steer for the southwestern and outer of the five red spar buoys, marking the southwest edge of Carruthers and Point Frederick Shoals. Round this buoy at the distance of 100 yards (91m4), and bring Barriefield Common leading lights in line ahead, bearing 037°, which will lead in, with a depth of 16½ feet (5m0). A vessel drawing less than 10 feet (3m0) may cross the above shoals by keeping the dome of St. George's Cathedral over the south end of Swift's dock, bearing 301°. With local knowledge, a depth of 13 feet (4m0) may be carried to Montreal Transportation Company's wharf, by passing between the above shoals and the Point Frederick shore.

Kingston to Alexandria Bay.—On leaving Kingston Harbour, steer 217° with the Barriefield range lights in line, astern, until past the outer red spar buoy marking Carruthers Shoal, when haul southward and eastward, and steer 068°, passing a quarter of a mile south of Cedar Island, and northward of Bayfield

Charts 1458, 1477.

Shoal black and red striped buoy. At night to ensure this keep Cold Bath Shoal light-buoy, 46 T well open north of Knapp Point light, as the two in line, bearing 078°, lead over this shoal with 8 feet (2m4) of water on it. Oak Point in line with Knapp Point, bearing 084°, also leads north of Bayfield Shoal. Passing a quarter of a mile north of the latter lighthouse, keep Cold Bath Shoal light-buoy, 46 T, (distant 3 miles), fine on the port bow, steering 085°. Passing close south of it and steer 090° for Quebec Head light, distant 7·7 miles.

Haul sharply southward into the entrance of Wolfe Island dredged cut, passing a cable off the light at Quebec Head, and keep the light-buoy at the other end fine on the port bow until through. Thence keep Quebec Head light in line with the light-buoy, steering 130°, until three-quarters of a mile past the latter, to be clear of Blanket Shoals (*see* page 149). Now haul eastward with Bartlett Point light a little on the starboard bow steering 066° until abreast the light, when alter course and steer 061° until 2½ cables above Chapman Shoal light. Now steer 048°, until abreast the rocks east of North Colborne Island, and then steer 059° for 2½ miles. When 2½ cables above Rock Island light steer 051° for 2·6 miles to a point one cable below the bridge, and then steer 055° for 2·4 miles with Comfort Island light a very little on the starboard bow. When a cable above Comfort Island light, steer 039° for nearly a mile passing half a cable northwest of the light and close south of Pullman Shoal Light; when abreast this light, alter course 3° and head 036° passing between Frontenac Shoal red spar buoy and Broadway Shoal red and black horizontally striped buoy and close northwest of Sunken Rock Shoal light and nearly a cable from Sunken Rock light. When abreast Sunken Rock light, proceed thence as directed on page 141, if bound, downriver, or pass south of Broadway Shoal buoy to the wharf at Alexandria Bay.

Rockport to Kingston by Middle Channel.—(For directions, Prescott to Rockport, see page 140). From Rockport, proceed westward through Raft Narrows, the general course being 252°, keeping the main shore well aboard. Pass 80 yards (73m2) south of the light on Wood Island and haul sharply southward into Fiddlers Elbow Channel between Wood and Lynedoch Islands. Pass between the black spar off Lynedoch Island light and the southern extremity of Lynedoch Island. From Lynedoch Island light, steer 240° for 3 miles or until 300 yards (274m3) off Abercrombie Island, lying off Grand View Park, passing between the red light-buoy, marking Steeple Shoal and the black spar southeast of it, and south of the red spar lying north of Abercrombie Island.

From the position north of Abercrombie Island steer 236° for nearly 3 miles, or until about a cable eastward of the red spar buoy, moored south of Bloodletter Island, taking care to pass about midway between the red and the black spars, marking the channel. Pass northwest of Niagara and Camelot Islands, steering 243°, as far as the red spar buoy, marking the southwest extreme of the shoals extending from the Dumfounder Islands group, whence steer 277° to a point about 750 feet (228m6) north of the Punts Islands beacon. Now steer 229° to a point half a cable south of Bass Rock Island. From thence, steer 238° for half a mile, passing between a red spar and a black spar buoy. When abreast the black buoy, steer 244° for 6¾ miles, passing between a black spar and a black and red horizontally-striped buoy, or until half a mile northward of Holliday Point, when Cold Bath Shoal light-buoy, distant 3 miles, may be steered for. (If from Rockport to Kingston by the North Channel, *via* Gananoque *see* below.)

Charts 1458, 1477.

There is a deep unbuoyed passage between the Punts Island (*Lat. 44°18′ N., Long. 76° 08′ W.)* and those south of them, **Barge** and **Gig Islands,** used by mariners who are locally acquainted.

If proceeding to Gananoque, a vessel from abreast the red spar north of Abercrombie Island may steer 254° for Gananoque Narrows light, distant 1¼ miles, passing north of a black spar, and south of the red spar buoy in the narrows. Having passed south of the cluster of boulders (*see* page 144) a third of a mile west of Gananoque Narrows lighthouse, a 271° course may be steered with Jackstraw Shoal light a little on the starboard bow and the day beacon a little on the port bow. Pass between them, and, thence, on the same course, for the wharves at Gananoque with Gananoque Narrows light seen between the day beacon and Jackstraw Shoal light, astern. (For directions, Gananoque to Kingston, *see* below.)

Kingston to Rockport, by Middle Channel.—Proceed as for Alexandria Bay, until 3 miles east of Cold Bath Shoal light-buoy and half a mile north of Holliday Point, whence haul eastward, and steer 064°, for 6¾ miles, or until abreast the black spar buoy southwestward of Bass Island, having on this course passed to the northward of a black spar buoy and south of a red and black horizontally-striped buoy. From this point, steer 058° for half a mile until abreast Bass Rock Island, and thence steer 049° for 1½ miles to about a cable north of the Punts Island beacon; haul sharply to southeastward, steering 097°, until south of the red spar at the southeastern edge of the Dumfounder Group, and pass north of Camelot and Niagara Islands, to about midway between the latter and the red spar, south of Bloodletter Island. Hence steer 056°, passing between the red and the black spars, marking the shoals, west of Grand View Park. When north of Abercrombie Island, lying off Grand View Park, steer 060° to pass between the red light-buoy on Steeple Shoal and the black spar on the 7-foot (2^{m}1) spot, southeast of it, with Lynedoch Island light fine to starboard and Steeple Shoal red light-buoy on the port bow, and into Fiddlers Elbow Channel, passing north of the black spar off Lynedoch Island light.

Proceeding through the Elbow, pass southeast of Wood Island, turning eastward into Raft Narrows, passing north of Georgina Island. Keep the mainland shore aboard, until down to Club Island, the general course being 072°, when berth at Rockport wharf, or proceed northeastward, as directed on page 141.

Gananoque to Rockport.—From the former, steer for Gananoque Narrows light seen between the day beacon and Jackstraw Shoal light, bearing 091°; pass between the light and the day beacon, and south of the cluster of boulders, a third of a mile west of Gananoque Narrows (*see* page 144). Pass through the latter, leaving the red spar buoy on the port, and a black spar buoy on the starboard hand. Thence, steer 074° to pass south of the red spar buoy lying north of Abercrombie Island, and continue for Lynedoch Island light, as directed above.

Gananoque to Clayton.—Vessels of light draught pass through Admiralty Group (*see* page 149) through the dredged buoyed cut west of Tidds Island and west of the black spar buoys off Melville Island. The track now passes between the black light-buoy, and the red spar buoy at Juniper Island, thence southward between Grindstone and Francis Islands with the east end of Blanket Island Shoal light and Spectacles Rocks and northeast of a black buoy 300 yards (274^{m}3) west of it. When Gull Island is reached, a vessel may haul over for Clayton.

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Gananoque to Kingston.—Pass north of the black spar buoy moored on the 5-foot (1^{m}5) patch southeast of Ormiston Island; thence, close south of Pike Island; east of the red spar buoy and northwest of the black spar buoys lying northeast of Spectacles Shoal light. Thence between Spectacles Islands and Spectacles Shoal light; northwest of the black spar buoy, 380 yards (317^{m}0) northeast of Redhorse Rock light, and southeast of the two red spherical buoys off Point Island.

Now, haul south, and pass between Redhorse Rock light, and on either side of the striped, red and black buoy on Anchor Shoal; thence, between Burnt Island light and the similarly-coloured spherical buoy on Tin Cap Shoal, passing west of Mermaid Island and following the southeast coast of Howe Island, until northwest of Holliday Point, whence, proceed to Kingston, as directed on page 163).

There is also a passage for light draught vessels northwest of Howe Island, known as Bateau Channel (*see* page 151), which is entered between Redhorse Rock light and Howe Island. Be guided by the buoys, and join the other track south of Milton Island.

Kingston to Gananoque.—Vessels will proceed as directed on page 165, until northwest of Holliday Point, when they will follow the southeast coast of Howe Island for 6¼ miles, until abreast Burnt Island light. Now, pass between it and the striped black and red spherical buoy marking Tin Cap Shoal (*see* page 150). Pass on either side of a similarly-coloured buoy on Anchor Shoal, and north of Redhorse Rock light; thence, southeast of two red spherical buoys marking the bank from Point Island, and north of the black spar buoy moored 380 yards (317^{m}0) northeast of the lighthouse. Thence, pass between Spectacles Shoal light and Spectacles Rocks and northeast of a black buoy 300 yards (274^{m}3) farther on; eastward of the red spar buoy and westward of the black spar buoy, keeping afterwards near the mainland shore, close south, of Pike Island, and north of the black spar buoy moored southeast of Ormiston Island, and, thence, to Gananoque wharves. (If continuing on northeast, proceed as directed on page 165).

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Note: All names prefixed by Saint, Sainte will be found indexed in alphabetical order after the letter "S".

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